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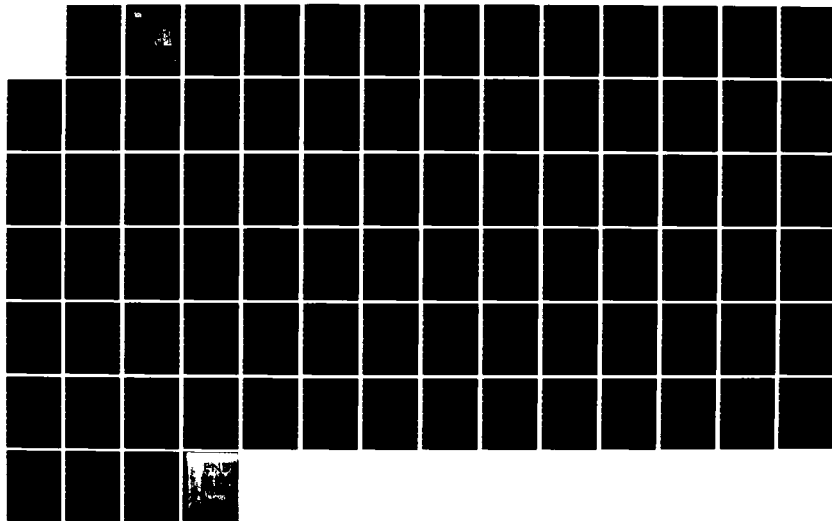
REFRIGERATION AND CRYOGENICS CAREER LADDER AFSC 54530
54550 AND 54570(U) AIR FORCE OCCUPATIONAL MEASUREMENT
CENTER RANDOLPH AFB TX JUL 83

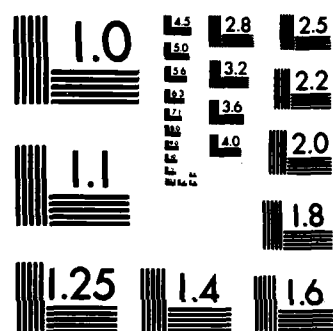
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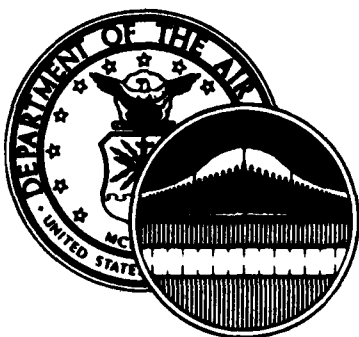




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UNITED STATES AIR FORCE

OCCUPATIONAL SURVEY LIQUID OXYGEN REPORT



REFRIGERATION AND CRYOGENICS
CAREER LADDER

AFSCs 54530, 54550, AND 54570
AFPT 90-545-461
JULY 1983

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OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150

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HQ TAC/DPAT	3	3		3
HQ TAC/DPLATC	1	1		1
HQ USAF/LEYSF	1	1		
HQ USAF/MPPT	1	1		1
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HQ USAFE/DPATC	1	1		1
HQ USMC (CODE TPI)	1	1		
LMDC/AN	1			
NODAC	1	1		
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TABLE OF CONTENTS

	<u>PAGE NUMBER</u>
PREFACE -----	iii
SUMMARY OF RESULTS -----	iv
INTRODUCTION -----	1
Background -----	1
SURVEY METHODOLOGY -----	2
Inventory Development -----	2
Survey Administration -----	2
Survey Sample -----	2
Data Processing and Analysis -----	5
Task Factor Administration -----	5
SPECIALTY JOBS (Career Ladder Structure) -----	8
Overview -----	8
Group Descriptions -----	10
Comparison of Specialty Jobs -----	18
ANALYSIS OF DAFSC GROUPS -----	24
Skill-Level Descriptions -----	24
Summary -----	25
ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS -----	30
ANALYSIS OF TAFMS GROUPS -----	31
First-Enlistment Personnel -----	31
Job Satisfaction -----	32
ANALYSIS OF CONUS/OVERSEAS GROUPS -----	37
ANALYSIS OF MAJCOM GROUPS -----	39
TRAINING ANALYSIS -----	41
Training Emphasis -----	41
Specialty Training Standard -----	42
Plan of Instruction -----	43
COMPARISON TO PREVIOUS SURVEYS -----	50
SPECIAL CONSIDERATIONS -----	54
DISCUSSION AND IMPLICATIONS -----	62
APPENDIX A - SELECTED REPRESENTATIVE TASKS FOR CAREER LADDER STRUCTURE GROUPS -----	65

PREFACE

This report presents the results of a detailed Air Force Occupational Survey of the Refrigeration and Cryogenics career ladder (AFSCs 54530, 54550, and 54570). The project was directed by USAF Program Technical Training, Volume Two, dated February 1982. Authority for conducting occupational surveys is contained in AFR 35-2. Computer products from which this report was produced are available for use by operating and training officials.

The survey instrument was developed by Mr Michael Bozardt, Inventory Development Specialist, and computer programming support was furnished by Ms Vera Frechel. Second Lieutenant John M. Bell, Occupational Analyst, analyzed the data and wrote the final report. This report has been reviewed and approved by Lieutenant Colonel Jimmy L. Mitchell, Chief, Airman Career Ladders Analysis Section, Occupational Analysis Branch, USAF Occupational Measurement Center, Randolph AFB, Texas 78150.

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel (see DISTRIBUTION on page i). Additional copies are available upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Analysis Branch (OMY), Randolph AFB, Texas 78150.

This report has been reviewed and is approved.

PAUL T. RINGENBACH, Colonel, USAF
Commander
USAF Occupational Measurement
Center

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Chief, Occupational Analysis Branch
USAF Occupational Measurement
Center

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SUMMARY OF RESULTS

1. Survey Coverage: The Refrigeration and Cryogenics career ladder was surveyed and analyzed to determine the effects of the 1980 merger of two career ladders; other major classification and training considerations were also investigated and discussed. Survey results are based on responses from 1,139 airmen (62 percent of all assigned 545X0 career ladder personnel).

2. Specialty Jobs: The study identified 3 clusters, covering 10 job types. The career ladder was clearly divided between a Refrigeration and Air Conditioning Personnel cluster (77 percent of the sample) and a Cryogenics Plant Operators cluster (10 percent of the sample); the remainder of career ladder personnel were distributed across a Supervisors cluster (5 percent of the sample) and 2 small independent job types. While a large amount of specialization was noted (mainly in the Cryogenics cluster), the analysis generally supports the current one-ladder classification structure.

3. Career Ladder Progression: The 3- and 5-skill level jobs were oriented highly toward the general maintenance functions, with little responsibility for supervision and management. Seven-skill level members, although still performing some maintenance tasks, spent the majority of their duty time in supervisory, managerial, or administrative functions.

4. AFR 39-1 Specialty Descriptions: The 3-/5-skill level and 7-skill level descriptions accurately reflected the jobs of the career ladder personnel.

5. Training Analysis: Both the STS and POIs, while requiring some review on certain proficiency codes and unmatched tasks, appear in good order and no major problems were identified.

6. Implications: Based on the amount of commonality between the two functional areas and the relatively high job satisfaction indicators, the current career ladder classification is supported, with four recommendations:

(a) The cryogenics function should remain in the 545X0 career ladder.

(b) To solidify the learning experience, first-job personnel should be assigned to civil engineering squadrons (CES) (with more variety of Refrigeration and Air Conditioning activities), rather than support activities which are limited in both variety of work and systems maintained.

(c) A current problem is the assignment policy of sending all 545X0 personnel overseas before returning anyone for a second tour. To ensure that enough experienced cryogenics personnel are assigned overseas, the critical supervisory and technical positions need to be designated as requiring a cryogenics special experience identifier (SEI).

(d) The cryogenics function involves operation and maintenance of a real property facility and the nature of the work is closely related to refrigeration and air conditioning, as evidenced by the commonality of many tasks and current integrated training programs. Thus, the management of the 545X0 personnel assigned to cryogenics plants should be aligned with the management of the remainder of the career ladder.

OCCUPATIONAL SURVEY REPORT
REFRIGERATION AND CRYOGENICS
CAREER LADDER
(AFSCs 54530, 54550, AND 54570)

INTRODUCTION

↙
This is a report of an occupational survey of the Refrigeration and Cryogenics career ladder (AFSCs 54530, 54550, and 54570) completed by the Occupational Analysis Branch, USAF Occupational Measurement Center, in May 1983. The survey was requested by the Classification Branch of the Air Force Manpower and Personnel Center (HQ AFMPC/MPCRQ2) to evaluate the effect of the April 1980 merger of the Refrigeration and Air Conditioning career ladder (AFS 545X0) and the Cryogenics Fluids Production career ladder (AFS 544X0). Previous occupational survey reports (OSRs) on these career ladders were published in September 1977 and June 1978, respectively.

Background

Earlier occupational survey reports concluded that both career ladders were relatively stable in terms of the kinds of jobs and tasks performed. However, the Cryogenics Fluids Production career ladder was experiencing a large overseas imbalance and several ideas to merge that career ladder with another ladder having more continental United States (CONUS) assignments were considered. A special study of the Cryogenics Fluids Production career ladder published in December 1973 concluded the most logical choice of transfer would be to the Refrigeration and Air Conditioning career ladder. This was based on a number of considerations, including: (a) the compatibility of the refrigeration and cryogenics functions; (b) the compatibility of the specialized tools in both functional areas; (c) the existing crossover between the two ladders; and (d) the basic incompatibility of cryogenics with either the Fuels or Environmental Systems Repair career ladders. The Refrigeration and Air Conditioning and the Cryogenics Fluids Production career ladders were merged in April 1980.

As described in the AFR 39-1 specialty descriptions, personnel in this career ladder are responsible for maintenance, operation, repair, and supervision of refrigeration, air conditioning, and cryogenics fluids production activities, plants, and systems. Primary entry into the career ladder is from Basic Military Training School (BMTS) through a Category A, 51-day formal training course, conducted at Sheppard TTC, Texas. Another Category A, 50-day formal training course is conducted at Chanute TTC, Illinois, for personnel prior to assignment in the cryogenics functional area, with a special experience identifier (SEI) awarded upon completion of training and 90 days field experience.

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SURVEY METHODOLOGY

Inventory Development

The data collection instrument for this occupational survey was USAF Job Inventory AFPT 90-545-461, dated June 1982. A tentative task list was prepared after reviewing pertinent career ladder publications and directives, tasks from previous survey instruments, and data from the last OSR. The task list was then evaluated in the field through personal interviews with 17 subject-matter specialists from 7 bases. The resulting job inventory contained a comprehensive listing of 442 tasks grouped under 15 duty headings and a background section requesting information, such as grade, duty title, time in service, job satisfaction, and the types of equipment maintained.

Survey Administration

From August 1982 through January 1983, Consolidated Base Personnel Offices (CBPOs) in operational units worldwide administered the inventory to personnel holding the Refrigeration and Cryogenics DAFSC 545X0. These participants were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Air Force Human Resource Laboratory (AFHRL).

Each individual who completed the inventory first completed an identification and biographical information section and then checked each task performed in his current job. Each participant then rated the tasks checked on a nine-point scale showing relative time spent on each, as compared to all other tasks checked. The ratings ranged from one (very small amount of time spent) to nine (very large amount of time spent).

To determine relative time spent for each task checked by a respondent, all of an incumbent's ratings are assumed to account for 100 percent of his or her time spent on the job and are summed. Each task rating is then divided by the total task ratings and multiplied by 100 to provide a relative percentage of time for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and relative percent time spent.

Survey Sample

Personnel were selected to participate in the survey to ensure an accurate representation across major commands (MAJCOMs) and paygrade groups. All eligible DAFSC 545X0 personnel (i.e., only those 3-, 5-, and 7-skill level individuals who have held the AFSC for at least six weeks and who have been working in their present job for at least six weeks) were mailed survey booklets. Table 1 reflects the percentage distribution, by MAJCOM, of assigned personnel in the career ladder as of April 1982. Also listed in this table is the percentage distribution, by MAJCOM, of respondents in the final survey sample. The 1,139 respondents included in the

final sample represent 62 percent of the total assigned 545X0 personnel. Table 2 reflects the paygrade group distributions and Table 3 reflects the total active federal military service (TAFMS) groups. As reflected in these tables, the survey sample is an excellent representation of the career ladder population.

TABLE 1
COMMAND REPRESENTATION OF 545X0 SURVEY SAMPLE

<u>COMMAND</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF SAMPLE</u>
TAC	24	24
SAC	18	19
USAFE	14	14
PACAF	10	11
ATC	9	8
MAC	8	8
AFLC	5	5
AFSC	4	3
AFCC	3	2
AAC	2	2
ADZ	1	1
ESC	1	1
OTHERS	<u>1</u>	<u>2</u>
TOTALS	100	100

TOTAL 545X0 PERSONNEL ASSIGNED - 1,838
TOTAL 545X0 PERSONNEL SAMPLED - 1,139
PERCENT OF 545X0 PERSONNEL SAMPLED -62%

TABLE 2
PAYGRADE REPRESENTATION OF 545X0 SURVEY SAMPLE

<u>PAYGRADE</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF SAMPLE</u>
AIRMAN	35	35
E-4	22	23
E-5	27	26
E-6	11	12
E-7	5	4
E-8	*	*
E-9	*	*
TOTALS	100	100

* DENOTES LESS THAN ONE PERCENT

TABLE 3
TAFMS REPRESENTATION OF 545X0 SURVEY SAMPLE

<u>TAFMS</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF SAMPLE</u>
1-48	44	46
49-96	26	24
97+	<u>30</u>	<u>30</u>
TOTALS	100	100

Data Processing and Analysis

Once job inventories are returned from the CBPOs, the background information and task responses are checked for proper completion. The data is then entered into the computer. A series of related computer programs, called the comprehensive occupational data analysis program (CODAP) are then applied to the data to aid in analysis. CODAP identifies groups of survey respondents based on the time spent performing those tasks.

The basic identifying group used in the hierarchical job structuring process is called a job type. A job type is a group of individuals who perform many of the same tasks and spend similar amounts of time performing them. When there is a substantial degree of similarity between different job types, they are grouped together and labeled as a cluster. If a specialized job type is too dissimilar to others to be grouped into a cluster, it is labeled an independent job type.

These groups are then analyzed to determine current utilization patterns and to examine the accuracy and completeness of career ladder documents.

Task Factor Administration

In addition to completing the job inventory, selected senior 545X0 personnel completed a second booklet for either training emphasis (TE) or task difficulty (TD). The TE and TD booklets were processed separately from the job inventories. The information is used in a number of different analyses discussed in more detail within this report.

Task Difficulty. Each individual completing a task difficulty booklet was asked to rate all of the tasks on a nine-point scale (from extremely low to extremely high) as to the relative difficulty of each task in the inventory. Difficulty is defined as the length of time required by the average member to learn to do the task. Task difficulty data were independently collected from 40 experienced senior-level personnel stationed worldwide (see Table 4). When TD ratings for this AFSC were analyzed, it became apparent that raters with the same prior AFSC (544X0 or 545X0) tended to give similar task difficulty ratings. As a result, the task difficulty ratings were broken into two groups according to these two rating policies. The interrater reliability (as assessed through components of variance of standard group means) is .94 for the 28 previous 545X0 personnel, and .85 for the 12 previous 544X0 raters. These reliability figures suggest a high agreement among raters. Ratings were adjusted so tasks of average difficulty have ratings of 5.00. The resulting data are essentially a rank ordering of tasks indicating the degree of difficulty for each task in the inventory.

Training Emphasis. Individuals completing training emphasis booklets were asked to rate tasks on a ten-point scale (from no training required to extremely heavy training required). Training emphasis is a rating of which tasks require structured training for first-term personnel. Structured training is defined as training provided at resident technical schools, field training detachments (FTD), mobile training teams (TT), formal OJT, or any

other organized training method. Training emphasis data were independently collected from 37 experienced senior-level personnel stationed worldwide (see Table 4). Because of unique training situations between the two functional areas within the AFSC, TE ratings were broken into two groups: one included the TE as rated by refrigeration personnel and one as it was rated by cryogenics personnel. The interrater reliability (as assessed through components of variance of standard group means) for the 23 refrigeration personnel was .92, suggesting a high degree of agreement among the raters as to which tasks required some form of structured training and which did not. In this functional area, tasks rated high in training emphasis have ratings of 4.5 and above, with an average TE of 2.7. The interrater reliability for the 14 cryogenics personnel was .84. In this functional area, tasks rated high in TE have ratings of 4.4 and above, with an average of 2.6.

When used in conjunction with other factors, such as percent members performing, the task difficulty and training emphasis ratings can provide an insight into training requirements. These data may help validate the lengthening or shortening of specific units of instruction in various training programs.

TABLE 4
COMMAND REPRESENTATION OF TASK DIFFICULTY AND
TRAINING EMPHASIS RATERS

<u>COMMAND</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF TE RATERS (REFRIG)</u>	<u>PERCENT OF TE RATERS (CRYO)</u>
TAC	24	18	19
SAC	18	15	11
USAFE	14	25	22
PACAF	10	8	13
ATC	9	8	5
MAC	8	10	11
AFLC	5	5	5
AFSC	4	0	3
AFCC	3	7	3
AAC	2	0	0
ADZ	1	0	0
ESC	1	2	3
OTHERS	<u>1</u>	<u>2</u>	<u>5</u>
TOTALS	100	100	100

SPECIALTY JOBS (Career Ladder Structure)

One very important function of the USAF occupational analysis program is to identify the distinct jobs performed within a career ladder and how these jobs relate to each other. The resulting display of this analysis, known as the career ladder structure, is used in a number of ways: to analyze the diversity or specialization within a career ladder which might require merging, shredding, or dividing the ladder; to examine the accuracy and completeness of career ladder documents (AFR 39-1 Specialty Descriptions, Specialty Training Standards, the basic course Plan of Instruction, etc.); to formulate an understanding of current utilization patterns; and to identify job satisfaction problems, trends, and issues requiring management attention.

Overview

Analysis of the Refrigeration and Cryogenics survey results identified 3 clusters, 10 job types within these clusters, and 2 independent job types. Based on task similarity and relative time spent, the division of jobs performed by 545X0 personnel is illustrated in Figure 1. These clusters, job types, and independent job types are listed below. The group (GRP) number shown beside each title is a reference to the computer printed information; the number of personnel in the group (N) is also shown. The number of personnel in the job types included in each cluster does not necessarily equal the number shown for that cluster; in those cases, the job of the remainder of the personnel in that cluster is adequately described in the cluster description.

I. REFRIGERATION AND AIR CONDITIONING PERSONNEL (GRP039, N=877)*

- A. Refrigeration and Air Conditioning First-Line Supervisors (GRP419, N=48)
- B. Air Conditioning Support Personnel (GRP094, N=72)
- C. Heating, Ventilation, and Air Conditioning (HVAC) Personnel (GRP125, N=7)

* The jobs of 750 personnel in the cluster are adequately described by the cluster description.

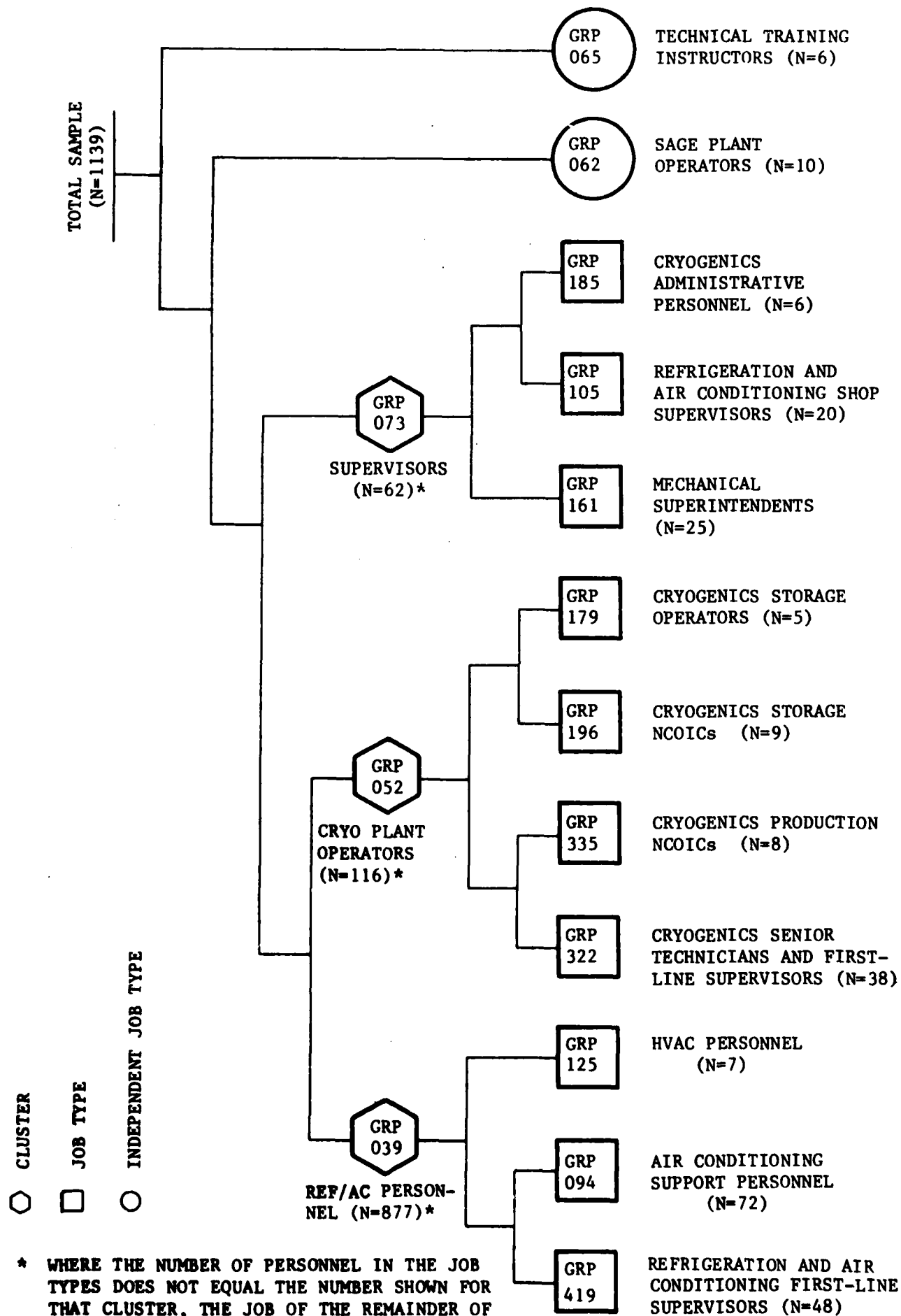
II. CRYOGENICS PLANT OPERATORS (GRP052, N=116)*

- A. Cryogenics Senior Technicians and First-Line Supervisors (GRP322, N=38)
- B. Cryogenics Production NCOICs (GRP335, N=8)
- C. Cryogenics Storage NCOICs (GRP196, N=9)
- D. Cryogenics Storage Operators (GRP179, N=5)

* The jobs of 56 personnel in the cluster are adequately described by the cluster description.

FIGURE 1

545XO CAREER LADDER STRUCTURE



III. SUPERVISORS (GRP073, N=62)*

- A. Mechanical Superintendents (GRP161, N=25)
- B. Refrigeration and Air Conditioning Shop Supervisors (GRP105, N=20)
- C. Cryogenics Administrative Personnel (GRP185, N=6)

* The jobs of 11 personnel in the cluster are adequately described by the cluster description

IV. SEMI-AUTOMATIC GROUND ENVIRONMENT (SAGE) PLANT OPERATORS (GRP062, N=10)

V. TECHNICAL TRAINING INSTRUCTORS (GRP065, N=6)

Ninety-four percent of the survey respondents are grouped in the clusters and independent job types listed above. The remaining six percent perform jobs that are different enough that they do not group with any of the defined job types. Job titles given by these ungrouped respondents include Power Plant Supervisor, Training Advisor, Career Advisor, Delta Chiller Operator, Environmental Control Specialist, Mechanical Planner, and Functional Manager.

Group Descriptions

The following paragraphs contain brief job descriptions of the clusters, job types, and independent job types identified through the career ladder structure analysis. Selected background and job satisfaction data are provided for these groups in Tables 5 and 6. Representative tasks for all the above groups are contained in Appendix A.

I. REFRIGERATION AND AIR CONDITIONING PERSONNEL (GRP039). This, the largest of the 3 clusters, contains 877 airmen, or 77 percent of the survey sample. The majority of the personnel in this cluster (750 of 877) are performing jobs that are adequately described by the cluster description. There were also three job types in the cluster performing jobs that were sufficiently different to merit further discussion. This section of the report discusses the job and personnel characteristics that typify the cluster first, then describes the three job types that warranted separate descriptions.

The primary responsibility of the cluster personnel is maintaining refrigeration and air conditioning systems and related components and systems. One-third of the group's time is spent performing a core of general duties (common to all nonsupervisory personnel in the AFSC). The maintenance of specific refrigeration and air conditioning systems, major components, and control systems, along with this core of general duties, accounts for over 80 percent of the total job time. Personnel in the cluster perform an average of 130 tasks. Tasks representative of the cluster include:

- perform recurring maintenance program (RMP) on air conditioning systems
- isolate malfunctions within refrigeration systems, such as to compressors, electrical systems, or condensers
- perform RMP on refrigeration systems other than cryogenics
- remove or install piping or tubing, such as water refrigerant, or fuel lines
- locate refrigerant leaks, using halide leak detectors
- evacuate refrigeration or air conditioning systems

The major users of personnel in this cluster are TAC and SAC (with 26 and 22 percent, respectively); others are assigned to PACAF, USAFE, MAC (each with 9 percent), and ATC (8 percent). Seventy-four percent of the assignments are in CONUS. The airmen average over four years in the career field, and half are in their first enlistment. The majority of the cluster (64 percent) is qualified at the 5-skill level. Most of the respondents (80 percent or more) report their jobs as interesting, their talents and training well used, and that they are satisfied with the sense of accomplishment their jobs yield.

The specialized groups within the cluster that merit further discussion are described below.

A. Refrigeration and Air Conditioning First-Line Supervisors (GRP419). This job type of working supervisors performs the full range of technical tasks of the cluster and, additionally, performs some supervisory duties. This breadth of job is reflected in the average number of tasks they perform (259), which is the largest of any group identified in the study. Tasks which distinguish this group from the cluster include:

- supervise refrigeration and cryogenics specialists (AFSC 54550)
- perform continuity checks
- start up or shutdown refrigeration systems
- prepare APRs
- counsel personnel on personal or military-related problems

These airmen average an E-5 paygrade, just over 9 years in the career field, and 11 years in the service. Half hold a 7-skill level. All job satisfaction indicators for this group are relatively high.

B. Air Conditioning Support Personnel (GRP094). This job type of 72 people is characterized by its high relative amount of time spent maintaining industrial air conditioning systems, at the exclusion of work on most refrigeration systems. They also differ from the majority of the cluster in that they are assigned to a variety of organizations, whereas the majority of the cluster is assigned to civil engineering squadrons (CES). Organizations include combat communication groups (AFCC), electronic security squadrons (ESC), and tactical control squadrons (TAC), among others. The primary

responsibility of the group is the cooling of specialized communication, computer, and radar systems. Some of these assignments are mobile and some require shift work, although no clear pattern concerning these variations emerged. The jobs are more limited than those of the cluster as a whole, with an average of only 69 tasks. One-third of those in this group are conducting on-the-job training; additionally, the following tasks are typical of the job type:

- isolate electrical circuit malfunctions
- isolate malfunctions within package air conditioning units
- charge air conditioning or refrigeration systems with refrigerant other than for lithium bromide systems
- inspect or clean condensers
- remove or install electrical wiring

While the group averages nearly six years in the career field, one-third of the airmen are in their first enlistment. Half report feeling that they make little or no use of their training.

C. Heating, Ventilation, and Air Conditioning (HVAC) Personnel (GRP125). The seven airmen comprising this group are assigned to Civil Engineering Maintenance, Inspection, Repair, and Training (CEMIRT) teams of the Air Force Engineering and Services Center throughout five regions in CONUS. These experts specialize in the analysis of problems encountered in the air conditioning control systems of USAF units within the regions assigned. As troubleshooters, they are traveling a great amount of time and work in cooperation with the base CES where the problem occurs. Relative to the cluster, they perform a low average of 58 tasks. This group of experts spends more than one-third of their time maintaining control systems; typical tasks in this area include:

- isolate electronic control system malfunctions
- remove or install pneumatic control system components
- perform operational checks of electronic circuits
- inspect pneumatic or electrical controls for safety
- calibrate thermostats
- calibrate electronic controls

The members of this group are 5- and 7-skill level personnel, average over 10 years in the service and 8 in the career field, and indicate high job satisfaction.

II. CRYOGENICS PLANT OPERATORS (GRP052). This cluster is composed of 116 airmen (10 percent of the sample) who operate and maintain liquid oxygen (LOX) generating plants and work with LOX storage containers (cryotainers). As in the previous section, the jobs of most of these personnel are adequately captured by the cluster description, which is followed by a description of the four job types that warrant further discussion. Approximately one-fourth of the group's time is spent performing the core of

general duties. These duties, combined with the operation of the plants, support equipment, and cryotainers, and the maintenance of forms, logs, and records, account for 75 percent of their total job time. The Cryogenics Plant Operators are assigned to supply squadrons in USAFE (55 percent) and PACAF (25 percent), with the remainder assigned to other commands overseas and the cryogenics technical training facilities at Chanute AFB; only 7 percent of the sample was identified in CONUS. The four job types within the cluster overlap considerably in the type of work they do and typical tasks include:

- transfer fluids between cryotainers or servicing carts
- perform corrosion control, such as scraping, sanding, or painting
- perform odor tests
- set up or operate product purity test sets
- produce cryogenic products, such as gaseous and liquid oxygen or gaseous and liquid nitrogen
- maintain product purity during production

While 40 percent of the cluster are in their first enlistment, the average time in the career field is over 5 years, with over 7 years in the service. Most (58 percent) hold a 5-skill level, with 24 percent qualified at the 7-skill level; the remaining 18 percent are 3-skill level personnel. The specialized groups in this cluster that merit further discussion are described below.

A. Cryogenics Senior Technicians and First-Line Supervisors (GRP322). This group of 38 airmen, one-third of the cluster, varies from the general cluster description by its added tasks in supervision (over half of the members are supervising) and inspection within the immediate cryogenics production area. These airmen average 163 tasks (the cluster average is 119), are predominantly 5-skill level (63 percent) personnel, and average 8 years in the service. In general, they find their jobs interesting and perceive their talents and training are well-utilized. Tasks which distinguish them from the cluster as a whole include:

- perform preoperational or daily inspections of plants
- shut down LOX plants
- start up LOX plants
- perform periodic inspections on purging units
- inspect condition of gas storage cylinders
- perform leak tests on gas storage cylinders

B. Cryogenics Production NCOICs (GRP335). This job type of eight airmen represents the highest level of supervision in LOX production. While all are supervisors, they continue to perform a full range of cryogenics production tasks typical of the cluster. Because of this, they average a very high (203) number of tasks, nearly double the average of the cluster. Some distinguishing tasks include:

- inspect cryogenic plant operations
- analyze daily logs
- prepare APRs
- evaluate compliance with performance standards
- establish performance standards for subordinates
- evaluate maintenance or use of workspace, equipment, or supplies

With 75 percent of this group at the 7-skill level, the job type averages nearly 10 years in the career field and over 12 years in the service. The airmen's expressed job interest, perceived use of talents and training, and sense of accomplishment are all quite high, and their reenlistment intentions are the highest of all specialty job groups discussed here.

C. Cryogenics Storage NCOICs (GRP196). While clearly involved in the cryogenics functional area, this small group (N=9) spends only a very small amount of its time in the operation of LOX plants (which characterizes the cluster as a whole); its biggest area of responsibility is the operation of support equipment and cryotainers. In addition, these personnel supervise others in such work. Much of the basic cryogenics knowledge is required in such a position, but the actual number of tasks performed is much more limited, averaging only 81 tasks. Tasks common to this group include:

- operate vacuum pumps
- perform periodic inspections on cryotainers
- operate purge units
- perform periodic inspections on purging units
- perform periodic inspections on vacuum pumps

This group averages nearly 11 years in the career field and over 13 years in the service, and is the most senior group in the cluster. These NCOICs express a high sense of job interest and sense of accomplishment, but only half believe their training is being well used.

D. Cryogenics Storage Operators (GRP179). This job type of 5 airmen spends nearly half of its time operating support equipment and cryotainers. Those duties, along with the operation of LOX plants and general maintenance-type duties, account for over 80 percent of their time. In these and all other duty areas, however, the airmen perform an average of only 27 tasks, making it the most limited job in the cryogenics cluster. Typical tasks in this group are:

- ground cryogenic equipment, such as cryotainers or plant support equipment
- connect or disconnect cryotainer purging units
- check vacuum in cryotainers

- make entries on base fuels sampling and testing record forms (AFTO Forms 150)
- perform odor tests
- remove or install cryotainer line filters

All of the airmen are on their first job, and average less than one year in the career field. No one in the group feels his talents and training are well used, most say their job is dull, and only one anticipates reenlistment. This is perhaps due to a combination of characteristics of the job, including its extremely limited nature and the relatively low difficulty level of the tasks performed.

III. SUPERVISORS (GRP073). This supervisory cluster contains 62 people and represents approximately 5 percent of the sample. Most are assigned to refrigeration and air-conditioning functions, although a small group of cryogenics personnel was included. Cluster personnel, on the average, spend over 80 percent of their time on supervisory-type duties, such as planning, organizing, directing, and inspecting. This percentage also includes the amount of time spent conducting informal training, handling forms, and records administration. Typical tasks of the cluster include:

- counsel personnel on personal or military-related problems
- determine work priorities
- prepare APRs
- interpret policies, directives, or procedures for subordinates
- plan work assignments
- conduct OJT

Nearly 90 percent of the individuals in this cluster hold a 7-skill level, and nearly that many supervise. The cluster averages 14 years in the career field, over 16 years in the service, and all job satisfaction indicators for the cluster are relatively high.

A. Refrigeration and Air Conditioning Shop Supervisors (GRP105). The 20 members of this job type spend most of their time in the supervisory duties common to the cluster; 95 percent are directly supervising, with 80 percent supervising 6 or more people. At the same time, however, they are also performing some of the general maintenance tasks as the personnel in the Refrigeration and Air Conditioning cluster they are supervising. Over ten percent of their time is spent in performing training duties, including counseling and OJT. This variety of responsibilities gives the group a greater average number of tasks performed (159) than that of the cluster as a whole (89). Some typical tasks of this job type are:

- supervise refrigeration and cryogenic specialists (AFSC 54550)
- direct maintenance of equipment
- perform continuity checks
- maintain training records, charts, or graphs
- direct utilization of equipment

Ninety percent of the supervisors hold a 7-skill level, and the group averages nearly 18 years in the service and 15 years in the career field.

B. Mechanical Superintendents (GRP161). Although the position of Mechanical Superintendent is designated AFSC 54599 in the Mechanical/Electrical career field, this job type of 25 individuals (all with a 7-skill level) was found to be performing in that role. With an average paygrade of E-7, 96 percent were supervising others and 64 percent were supervising at least 6 people. Over 90 percent of the group's time was spent on supervisory duties, primarily inspecting and evaluating. Tasks which distinguished this group from the cluster include:

- supervise civilian employees
- assign sponsors for newly assigned personnel
- evaluate individuals for promotion, demotion, or reclassification
- write civilian performance ratings or supervisory appraisals
- inspect refrigeration or air conditioning repair shop operations
- indorse APRs

The job satisfaction indicators for this group were among the highest found for any groups, with the utilization of talents and training perceptions the best in the study.

C. Cryogenics Administrative Personnel (GRP105). The six people in this group were the only cryogenics-related individuals appearing in the Supervisors cluster. The group was identified here because of their supervisory duties and, primarily, for the relatively high amount of time spent maintaining forms, logs, and records. One of these individuals is identified as an Advisor on Cryogenics, one works in Quality Assurance, and three call themselves NCOICs. The tasks that distinguish this job type from the cluster include:

- make entries on requisition and invoice/shipping document forms (DD Forms 1149)
- direct development or maintenance of status boards, graphs, or charts

- make entries on cryogenic materials sample forms (AFTO Forms 176)
- inspect cryogenic plant operations
- evaluate compliance with performance standards
- evaluate maintenance reports or procedures

The job satisfaction indicators for this group are quite low. This is, perhaps, a function of a number of factors: the lack of hands-on or technical duties, the relatively small number of average tasks performed (67), the lack of experience in the cryogenics functional area (3 reported no previous cryogenics assignments), the newness of their jobs (2 had been in the job for fewer than 4 months), or a combination of these.

IV. SAGE PLANT OPERATORS (GRP062). This independent job type of ten airman is identified by the job location of the majority of its members--Semi-Automatic Ground Environment (SAGE) plants; these operations will be changed and relocated within the year due to new operating systems. Seven airmen in this group are presently assigned to Air Defense Squadrons (ADS), and operate large industrial air conditioning systems (usually 400-ton centrifugal chillers) which cool tracking and radar units in TAC. The remaining three airmen operate cooling systems in the Cheyenne Mountain, Colorado, complex. Since the maintenance of the systems is performed by contractors or Air Conditioning Support Personnel, the scope of this group's job is very limited (the airmen average only 21 tasks) and the job difficulty level is low. As a result, the members' perceptions of the utilization of their talents and training are low. The airmen average 5 years in the career field and E-4 paygrade, and most (60 percent) are 5-skill level individuals. Tasks common to these airmen are:

- maintain operator logs on air conditioning or refrigeration equipment
- analyze daily logs
- start up or shutdown cooling water systems
- start up or shutdown refrigeration systems
- blow down condensate from air tanks
- start up or shutdown diesel engines

V. TECHNICAL TRAINING INSTRUCTORS (GRP065). This independent job type is composed of 6 technical training school instructors who average nearly 10 years in the career field. Two-thirds of the group is qualified at the 7-skill level and the remaining third is qualified at the 5-skill level. As indicated by the group's job satisfaction responses, the airmen find their jobs interesting, feel their talents and training are well used, and have a generally positive sense of accomplishment. They spend over 60 percent of their time performing duties and tasks directly associated with the training function. Typical tasks are:

conduct resident course classroom training
administer tests
score tests
write test questions

Comparison of Specialty Jobs

In addition to reviewing the functions of each job, it is useful to compare the job groups in terms of background characteristics and job attitudes. Table 6 presents career ladder job group data pertaining to job satisfaction indicators, such as expressed job interest, perceived utilization of talents and training, and reenlistment intentions.

In most of the groups identified, members indicate a high amount of job interest and a satisfactory sense of accomplishment, with 12 of the 15 groups discussed showing over 60 percent responding positively. The jobs of the 3 groups where less than 60 percent of the incumbents reported positive job interest and sense of accomplishment--Cryogenics Storage Operators, Cryogenic Administrative Personnel, and SAGE Plant Operators--indicate a trend of jobs which are very limited in scope and complexity, and which do not cover the full range of duties characteristic of their respective functional areas. These three groups represent less than two percent of the survey sample. While this magnitude of dissatisfaction is not great, the suspected reasons for it do warrant a note to managers and supervisors, increasing their awareness of the potential effect of specialization in jobs that include only a limited subset of the tasks that are characteristic of the career ladder.

Perceived utilization of talents and training was very high for the job groups overall, with only 5 groups (3 of which were discussed above) having less than 70 percent responding positively. The two additional groups--Air Conditioning Support Personnel and Cryogenics Storage NCOICs--were fairly well satisfied that their talents were being well used, but nearly half in each of these felt that their training was poorly utilized. Again, these job groups perform fewer than the average number of technical tasks for their respective clusters, and the jobs they do perform are of less than average complexity.

Expressed reenlistment intent for the 15 groups was high, with all but one group reflecting positive intent by over 50 percent of the groups' airmen. The sole group reflecting negative reenlistment intentions is the Cryogenic Storage Operators, discussed above.

Review of the job inventory write-in comments from the survey sample supports the indication in Table 6 of relatively high job satisfaction. Survey respondents are encouraged to, and when there are serious problems in a career field usually do, write comments about perceived problems in the field. In this survey, only 86 airmen (8 percent) used the write-in option to convey some type of information (e.g., additional courses completed, additional job titles used, complaints, etc). Only five of these were complaints. Two of the complaints were from the Refrigeration and Air Conditioning cluster (one regarding shift work and one about military-civilian working teams) and three

from cryogenic cluster personnel (one on the frustration of being assigned to the cryogenics functional area before he could gain more refrigeration and air conditioning experience following that technical training school, and two on the difficulty of taking SKTs geared primarily to refrigeration and air conditioning personnel).

In summary, the career ladder structure analysis suggests that the present career ladder classification structure is working well. Job satisfaction responses indicate that the individuals and training generally are well matched to the job characteristics of the career ladder and, consequently, a relatively high percentage of these airmen are positively considering reenlistment. Another section of this report will deal further with issues regarding the compatibility of the two functional areas within this AFSC.

TABLE 5
SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

	JOB TYPES				JOB TYPES					
	REFRIG/AC PERSONNEL CLUSTER		REFRIG/AC 1ST-LINE SUPVRs		AC SUPPORT PERSONNEL		HVAC PERSONNEL		CRYOGENIC PLANT OPER CLUSTER	
NUMBER IN GROUP	877		48	72	7	116	38	8	9	5
PERCENT OF SAMPLE	77%		4%	6%	1%	10%	3%	1%	1%	*
PERCENT IN CONUS	74%		69%	64%	100%	7%	10%	0%	0%	0%
DAFSC DISTRIBUTION:										
54530	20%		4%	7%	0%	18%	13%	0%	0%	100%
54550	65%		44%	69%	57%	58%	63%	25%	44%	0%
54570	15%		52%	24%	43%	24%	24%	75%	56%	0%
AVERAGE GRADE	E-4	E-5	E-5	E-5	E-5	E-4	E-5	E-6	E-6	E-2
AVERAGE TICF (MOS)	51	110	71	98	98	63	70	118	130	11
AVERAGE TAFMS (MOS)	68	137	86	127	127	86	96	149	166	16
PERCENT IN FIRST ENLISTMENT	51%	10%	32%	14%	14%	40%	24%	0%	0%	100%
AVERAGE NUMBER OF TASKS PERFORMED	130	259	69	58	58	119	163	203	81	27

* DENOTES LESS THAN ONE PERCENT

TABLE 5 (CONTINUED)
SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

	JOB TYPES					
	REFRIG/AC		MECHANICAL		CRYOGENIC	
	SUPERVISORS CLUSTER	SHOP SUPERVISORS	SUPERINTENDENTS	ADMINISTRATIVE PERSONNEL	SAGE PLANT OPERATORS	TECHNICAL TRAINING INSTRUCTORS
NUMBER IN GROUP	62	20	25	6	10	6
PERCENT OF SAMPLE	5%	2%	2%	1%	1%	1%
PERCENT IN CONUS	61%	85%	60%	0%	100%	100%
DAFSC DISTRIBUTION:						
54530	2%	5%	0%	0%	30%	0%
54550	10%	5%	0%	0%	60%	33%
54570	88%	90%	100%	100%	10%	67%
AVERAGE GRADE						
AVERAGE T1CF (MOS)	E-6	E-6	E-7	E-6	E-4	E-6
AVERAGE TAFMS (MOS)	167	181	177	126	60	118
PERCENT IN FIRST ENLISTMENT	199	212	211	181	80	134
	2%	5%	0%	0%	40%	17%
AVERAGE NUMBER OF TASKS PERFORMED						
	89	159	54	67	21	13

**JOB SATISFACTION INDICATORS BY SPECIALTY JOB GROUPS
(PERCENT RESPONDING)***

	JOB TYPES			JOB TYPES					
	REFRIG/AC PERSONNEL CLUSTER	REFRIG/AC 1ST-LINE SUPVRs	AC SUPPORT PERSONNEL	HVAC PERSONNEL	CRYOGENIC PLNT OPER CLUSTER	CRYOGENIC 1ST-LINE SUPVRs	CRYOGENIC PROD NCOICs	CRYOGENIC STORAGE NCOICs	CRYOGENIC STORAGE OPERATORS
<u>EXPRESSED JOB INTEREST:</u>									
DULL	6	2	17	0	19	5	0	0	80
SO-SO	10	6	11	0	16	21	12	11	20
INTERESTING	81	88	68	100	64	74	88	89	0
<u>PERCEIVED USE OF TALENTS:</u>									
LITTLE OR NOT AT ALL	14	2	29	0	24	16	12	33	100
FAIRLY WELL TO PERFECTLY	85	96	69	100	75	84	88	67	0
<u>PERCEIVED USE OF TRAINING:</u>									
LITTLE OR NOT AT ALL	18	4	50	14	25	24	12	56	100
FAIRLY WELL TO PERFECTLY	82	94	49	86	75	76	88	44	0
<u>SENSE OF ACCOMPLISHMENT:</u>									
DISSATISFIED	13	2	24	0	21	16	25	11	80
AMBIVALENT	7	10	6	14	15	24	0	11	0
SATISFIED	80	85	69	86	64	60	75	78	20
<u>REENLISTMENT INTENTIONS:</u>									
WILL RETIRE	4	12	3	14	3	5	0	22	0
WILL NOT/PROBABLY									
WILL NOT REENLIST	28	17	21	0	24	37	0	0	80
WILL/PROBABLY WILL									
REENLIST	67	69	75	86	71	63	88	78	20

*COLUMNS MAY NOT EQUAL 100 PERCENT DUE TO NONRESPONSE OR ROUNDING

TABLE 6 (CONTINUED)
 JOB SATISFACTION INDICATORS BY SPECIALTY JOB GROUPS
 (PERCENT RESPONDING)*

	JOB TYPES						TECHNICAL TRAINING INSTRUCTORS
	SUPERVISORS CLUSTER	REFRIG/AC SHOP SUPERVISORS	MECHANICAL SUPERINTENDENTS	CRYOGENIC ADMINISTRATIVE PERSONNEL	SAGE PLANT OPERATORS		
<u>EXPRESSED JOB INTEREST:</u>							
DULL	7	0	4	17	20	0	
SO-SO	15	10	8	50	40	17	
INTERESTING	74	85	84	17	40	83	
<u>PERCEIVED USE OF TALENTS:</u>							
LITTLE OR NOT AT ALL	21	15	8	83	80	17	
FAIRLY WELL TO PERFECTLY	79	85	92	17	20	83	
<u>PERCEIVED USE OF TRAINING:</u>							
LITTLE OR NOT AT ALL	21	20	8	50	90	17	
FAIRLY WELL TO PERFECTLY	79	80	92	50	10	83	
<u>SENSE OF ACCOMPLISHMENT:</u>							
DISSATISFIED	24	15	16	50	40	33	
AMBIVALENT	5	10	0	17	20	0	
SATISFIED	71	75	84	33	40	67	
<u>REENLISTMENT INTENTIONS:</u>							
WILL RETIRE	24	40	28	0	0	17	
WILL NOT/ PROBABLY WILL NOT REENLIST	13	10	12	17	40	33	
WILL/PROBABLY WILL REENLIST	60	50	56	67	60	50	

* COLUMNS MAY NOT EQUAL 100 PERCENT DUE TO NONRESPONSE OR ROUNDING

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational analysis. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information is also used to evaluate how well career ladder documents, such as AFR 39-1 Specialty Descriptions and the Specialty Training Standard (STS), reflect what career ladder personnel are actually doing in the field.

A comparison of duty and task performance between 3- and 5-skill level (54530 and 54550) personnel indicates the jobs they perform are essentially the same. This is consistent with their common AFR 39-1 Specialty Descriptions. Therefore, they are discussed as one group (54530/54550) in this report.

The distribution of skill level groups across the career ladder job clusters and independent job types is displayed in Table 7, while Table 8 presents the relative percent time spent on each duty across the skill level groups. A typical pattern of progression is found, with personnel spending more of their relative time on duties involving supervisory and administrative tasks (Duties A, B, C, D, and E) as they progress to the 7-skill level (see Table 8).

Skill-Level Descriptions

DAFSC 54530/54550. The 887 3-/5-skill level personnel (78 percent of the survey sample) perform an average of 117 tasks, with 70 tasks accounting for over 50 percent of their job time. At this skill level, their work time is primarily devoted to general duties and the maintenance of major components and systems, which account for over 90 percent of their time. Most are involved with, and spend, a relatively large amount of time on tasks such as performing recurring maintenance on air conditioning systems and refrigeration systems. Additional representative tasks performed by group members are presented in Table 9. Supervisory-type duties (inventory duties A, B, C, and D) account for only 6 percent of their relative time, with only 19 percent of the group acting as supervisors. Most of the group (58 percent) are in their first enlistment, with one-quarter in their second. Indicators of job satisfaction, talent and training utilization, and sense of accomplishment are all very high.

DAFSC 54570. The 7-skill level group is composed of 246 airmen (22 percent of the survey sample). They perform an average of 122 tasks, 99 of which account for over half of their relative job time. While this group has not abandoned the maintenance duties of the 3-/5-skill level, there is an obvious increase in the supervisory duties (more than one-third of their time) and the number in the group supervising (more than 73 percent, nearly half of whom are supervising six or more people). Even so, performing general maintenance duties constitutes a large percentage of both time spent and the population involved. Representative tasks of the group may be found in Table 10. Nearly 90 percent of the 7-skill level airmen are in their third or subsequent enlistment. Again, indicators of job satisfaction, utilization of talents and training, and sense of accomplishment are all high.

Representative differences between the 54530/54550 and 54570 DAFSC groups are presented in Table 11. Again, it is clear that while the 7-skill level airmen still perform maintenance duties, they have greater responsibility for supervision, management, and training in the career ladder.

Summary

Career ladder progression is well defined, with personnel at the 3- and 5-skill levels spending the vast majority of their job time performing general and maintenance duties, while, at the 7-skill level, supervisory and administrative type functions increase to almost half of the job time.

TABLE 7
DISTRIBUTION OF DAFSC GROUP MEMBERS ACROSS CAREER LADDER
CLUSTERS AND INDEPENDENT JOB TYPES
(PERCENT MEMBERS RESPONDING)

JOB GROUPS	DAFSC 54530/50 (N=887)	DAFSC 54570 (N=246)
I. REFRIGERATION AND AIR-CONDITIONING PERSONNEL CLUSTER (N=877)**	84	54
II. CRYOGENICS PLANT OPERATORS CLUSTER (N=116)	10	11
III. SUPERVISORS CLUSTER (N=62)	1	22
IV. SAGE PLANT OPERATORS (N=10)	1	*
V. TECHNICAL TRAINING INSTRUCTORS (N=6)	*	2
PERCENT NOT GROUPED	<u>4</u>	<u>11</u>
TOTAL	100	100

* DENOTES LESS THAN ONE PERCENT

** FOUR RESPONDENTS DID NOT REPORT A DAFSC

TABLE 8

RELATIVE PERCENT TIME SPENT ON DUTIES BY DAFSC GROUPS

DUTIES	DAFSC	DAFSC
	54530/50 (N=887)	54570 (N=246)
A ORGANIZING AND PLANNING	1	9
B DIRECTING AND IMPLEMENTING	2	9
C INSPECTING AND EVALUATING	1	10
D TRAINING	2	7
E MAINTAINING FORMS, LOGS, AND RECORDS	3	7
F PERFORMING GENERAL REFRIGERATION, AIR-CONDITIONING, OR CRYOGENIC DUTIES	33	19
G MAINTAINING AIR-CONDITIONING SYSTEM	10	7
H MAINTAINING REFRIGERATION SYSTEMS OTHER THAN IN CRYOGENIC PLANTS	8	4
I MAINTAINING REFRIGERATION, AIR-CONDITIONING, OR CRYOGENIC PLANT MAJOR COMPONENTS	17	11
J MAINTAINING CONTROL SYSTEMS	10	8
K MAINTAINING COOLING TOWERS	4	2
L MAINTAINING REFRIGERANT OR AIR COMPRESSORS	5	4
M INSTALLATION OR REMOVAL OF CRYOGENIC (LOX) PLANTS	*	*
N OPERATING CRYOGENIC (LOX) PLANTS	2	2
O OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	2	2
TOTAL	100	100

* DENOTES LESS THAN ONE PERCENT

TABLE 9

REPRESENTATIVE TASKS PERFORMED BY 54530/54550 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=246)
F140 CLEAN TOOLS, PARTS, OR PIPING	88
F117 ADD OR CHANGE OIL	87
F151 MEASURE AND CUT COPPER TUBING	85
I258 INSPECT OR CLEAN CONDENSERS	84
I268 LOCATE REFRIGERANT LEAKS USING HALIDE LEAK DETECTORS	84
F144 FLARE COPPER TUBING	84
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	84
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	84
F136 CLEAN AIR FILTERS	82
I269 LOCATE REFRIGERANT LEAKS USING SOAP SOLUTIONS	81
F157 REMOVE OR INSTALL BELTS	80
I259 INSPECT OR CLEAN EVAPORATORS	79
F173 REPLACE AIR FILTERS	79
F145 INSPECT GAUGES OR LINES	77
F149 LUBRICATE BUSINGS OR BEARINGS	77
F167 REMOVE OR INSTALL PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	77
F129 ALIGN MOTORS	76
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	75
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING, OR PAINTING	75
G186 CHARGE AIR CONDITIONING OR REFRIGERATION SYSTEMS WITH REFRIGERANT OTHER THAN FOR LITHIUM BROMIDE SYSTEMS	75
I273 PUMP DOWN UNITS OF REFRIGERATION OR AIR CONDITIONING SYSTEMS	74
I288 REMOVE OR INSTALL ELECTRIC MOTORS	74
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR-CONDITIONING SYSTEMS	73
F174 REPLACE DRIER FILTERS OR CARTRIDGES	73
F177 SOFT SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	73
I292 REMOVE OR INSTALL FANS OR BLOWERS	72
F130 ALIGN PULLEYS	71
J329 PERFORM CONTINUITY CHECKS	71
H233 ISOLATE MALFUNCTIONS WITHIN REFRIGERATION SYSTEMS, SUCH AS TO COMPRESSORS, ELECTRICAL SYSTEMS, OR CONDENSERS	67
H235 PERFORM RECURRING MAINTENANCE PROGRAM ON REFRIGERATION SYSTEMS OTHER THAN CRYOGENICS	67

TABLE 10

REPRESENTATIVE TASKS PERFORMED BY 54570 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=246)
P25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	71
C63 PREPARE APRs	71
F151 MEASURE AND CUT COPPER TUBING	66
J329 PERFORM CONTINUITY CHECKS	63
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	63
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	63
A6 DETERMINE WORK PRIORITIES	62
F140 CLEAN TOOLS, PARTS, OR PIPING	62
F117 ADD OR CHANGE OIL	62
D70 CONDUCT OJT	61
E114 MAKE ENTRIES ON UNSERVICEABLE (CONDEMNED) TAG MATERIAL FORMS (DD FORMs 1577)	61
F145 INSPECT GAUGES OR LINES	61
F162 REMOVE OR INSTALL GAUGES	60
F129 ALIGN MOTORS	60
B36 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	60
D73 COUNSEL TRAINEES ON TRAINING PROGRESS	60
I258 INSPECT OR CLEAN CONDENSERS	60
I268 LOCATE REFRIGERANT LEAKS USING HALIDE LEAK DETECTORS	60
F167 REMOVE OR INSTALL PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	59
E115 MAKE ENTRIES ON UNSERVICEABLE (REPARABLE) TAG MATERIAL FORMS (DD FORMs 1577-2)	59
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	59
I269 LOCATE REFRIGERANT LEAKS USING SOAP SOLUTIONS	59
B28 DIRECT MAINTENANCE OF EQUIPMENT	58
A19 PLAN WORK ASSIGNMENTS	57
I259 INSPECT OR CLEAN EVAPORATORS	57
E110 MAKE ENTRIES ON SERVICEABLE TAG-MATERIAL FORMS (DD FORMs 1574)	57
F157 REMOVE OR INSTALL BELTS	57
I256 CHECK MOTORS FOR PROPER ROTATION	57
I288 REMOVE OR INSTALL ELECTRIC MOTORS	57
F130 ALIGN PULLEYS	57
D86 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	56
B40 SUPERVISE REFRIGERATION AND CRYOGENIC SPECIALISTS (AFSC 54550)	56

TABLE 11

**REPRESENTATIVE TASK DIFFERENCES BETWEEN 54530/54550 AND 54570 PERSONNEL
(PERCENT MEMBERS PERFORMING)**

TASKS	DAFSC 54530/50 (N=887)	DAFSC 54570 (N=246)	DIFFERENCE
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	73	48	+25
H245 START UP OR SHUTDOWN REFRIGERATION SYSTEMS	67	44	+23
.	.	.	.
.	.	.	.
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	17	71	-54
C63 PREPARE APRs	19	71	-52
D73 COUNSEL TRAINEES ON TRAINING PROGRESS	15	59	-44
A23 SCHEDULE LEAVES OR PASSES	7	51	-44
A6 DETERMINE WORK PRIORITIES	19	62	-43
A19 PLAN WORK ASSIGNMENTS	14	57	-43
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	12	54	-42
B40 SUPERVISE REFRIGERATION AND CRYOGENICS SPECIALISTS (AFSC 54550)	14	55	-41
A2 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	7	48	-41
D70 CONDUCT OJT	20	61	-41
D86 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	15	56	-41

ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS

The foregoing 3-/5- and 7-skill level survey data were compared to the AFR 39-1 Specialty Descriptions for the Refrigeration and Cryogenics Specialist (AFSC 54510/54530/54550) and the Refrigeration and Cryogenics Technician (AFSC 54570), dated 1 January 1982. These descriptions are intended to give a broad overview of the duties and tasks performed by each skill level of the career ladder.

Based on the preceding DAFSC analysis, the 3-/5-skill levels description appears complete and accurately reflects the broad range of duties and responsibilities of these personnel. Likewise, the 7-skill level description appears complete and accurate, reflecting not only the supervisory responsibilities, but the operation and maintenance duties as well, which is supported by the data.

ANALYSIS OF TAFMS GROUPS

In this study, as in most others, an analysis of total active federal military service (TAFMS) groups is undertaken to provide a description of how the jobs and the perception of those jobs within a career ladder change over time. As is typical in most career ladders, as time in service and experience increase, there is a corresponding increase in performance of duties involving supervisory, managerial, and training tasks (see Table 12). Conversely, as time spent in supervisory and administrative duties increases, performance time on tasks in the maintenance area generally declines. These shifts in primary areas of responsibility mirror the changes discussed earlier in the DAFSC analysis section.

First-Enlistment Personnel

First-enlistment personnel (1-48 months) number 522 in this study, or 46 percent of the survey sample. These airmen perform a full range of refrigeration, air conditioning, and cryogenics maintenance duties, with over 90 percent of their time being spent on such duties. Examples of these are performing recurring maintenance on air conditioning systems, cleaning and replacing air filters, cleaning tools, parts, and piping, and performing corrosion control. Table 13 provides a list of representative tasks of this group. Members of this group perform an average of 116 tasks.

Two-thirds of these airmen hold the grade of E-3, with over 99 percent at E-4 or below. Thirteen percent are women and 98 percent have completed at least 12 years of education or its equivalent. Nearly 70 percent are in their first job. Distribution of group members across specialty jobs is displayed in Figure 2, and reflects fairly well the distribution of the career ladder as a whole.

One matter of concern which should be addressed here is the assignment of first-enlistment personnel to jobs in which they perform a very narrow or specialized range of tasks. Examples of such limited jobs in this career area are Air Conditioning Support Personnel and SAGE Plant Operators. These jobs, as reported in the analysis of the career ladder structure, are very limited in scope (far below the averages of the first-termers as a whole, the career ladder as a whole, and the Refrigeration and Air Conditioning cluster). Further, because of the unique nature of these jobs, supervisors find it necessary to spend a relatively large amount of time on OJT.

OJT on reassignment to a CES is undoubtedly increased as well, to reacquaint these airmen with systems once learned, but never used. The learning experience would be enhanced if the first assignment of first-term technical training school graduates offered more variety. School house training would be reinforced and would be more firmly grasped and implemented. The logical place for this variety of tasks and experiences to be gained is in a CES. Assignments to organizations typically using SAGE Plant Operators and Air Conditioning Support Personnel might better be considered subsequent to the first enlistment. While the groups in question do not contain more than an equal percentage of first-enlistment personnel, the question is, "Do they contain more first-termers than they should, based on

the unique nature of the jobs?" Indications of the jobs performed and related OSR data support the idea that a smaller percentage of first-enlistment personnel should be assigned to these jobs.

Job Satisfaction

Comparisons of group perceptions of their jobs help career field managers understand some of the factors which may affect the job performance of today's airmen. This data was gathered through five inventory questions covering job interest, perceived utilization of talents and training, sense of accomplishment, and reenlistment intentions. Table 14 presents these data, along with the same information from comparative samples of all direct support AFSCs surveyed in 1982.

Comparisons of these groups reflect that job satisfaction indicators for all 545X0 TAFMS groups were above or comparable to the indicators for the comparative samples, while reenlistment intentions for the 545X0 groups were all higher. Judging from these responses, refrigeration and cryogenics personnel are satisfied with their jobs; further, they support the similar conclusion reached in the SPECIALTY JOBS section of this report.

TABLE 12

RELATIVE PERCENT TIME SPENT ON DUTIES BY TAFMS GROUPS

DUTIES	TAFMS (MONTHS)		
	1-48 (N=522)	49-96 (N=266)	97+ (N=345)
A ORGANIZING AND PLANNING	*	1	8
B DIRECTING AND IMPLEMENTING	1	3	8
C INSPECTING AND EVALUATING	*	2	8
D TRAINING	*	2	7
E MAINTAINING FORMS, LOGS, AND RECORDS	3	4	6
F PERFORMING GENERAL REFRIGERATION, AIR CONDITIONING, OR CRYOGENIC DUTIES	35	32	21
G MAINTAINING AIR CONDITIONING SYSTEMS	11	10	7
H MAINTAINING REFRIGERATION SYSTEMS OTHER THAN IN CRYOGENIC PLANTS	8	7	5
I MAINTAINING REFRIGERATION, AIR CONDITIONING, OR CRYOGENIC MAJOR COMPONENTS	18	16	11
J MAINTAINING CONTROL SYSTEMS	10	11	8
K MAINTAINING COOLING TOWERS	4	4	3
L MAINTAINING REFRIGERANT OR AIR COMPRESSORS	5	5	4
M INSTALLATION OR REMOVAL OF CRYOGENIC (LOX) PLANTS	*	1	*
N OPERATING CRYOGENIC (LOX) PLANTS	3	2	2
O OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	2	1	2

* DENOTES LESS THAN ONE PERCENT

TABLE 13

REPRESENTATIVE TASKS PERFORMED BY FIRST-ENLISTMENT PERSONNEL
(1-48 MONTHS TAFMS)

TASKS	PERCENT MEMBERS PERFORMING (N=522)
F117 ADD OR CHANGE OIL	90
F140 CLEAN TOOLS, PARTS, OR PIPING	89
F132 BEND COPPER TUBING	87
I268 LOCATE REFRIGERANT LEAKS USING HALIDE LEAK DETECTORS	86
F144 FLARE COPPER TUBING	86
F151 MEASURE AND CUT COPPER TUBING	86
I258 INSPECT OR CLEAN CONDENSERS	86
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	86
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS RECEIVERS, EVAPORATORS, TUBING, OR PIPING	84
F136 CLEAN AIR FILTERS	82
I269 LOCATE REFRIGERANT LEAKS USING SOAP SOLUTIONS	82
I259 INSPECT OR CLEAN EVAPORATORS	82
F157 REMOVE OR INSTALL BELTS	82
F173 REPLACE AIR FILTERS	80
F167 REMOVE OR INSTALL PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	79
F149 LUBRICATE BUSHINGS OR BEARINGS	78
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING, OR PAINTING	78
G186 CHARGE AIR CONDITIONING OR REFRIGERATION SYSTEMS WITH REFRIGERANT OTHER THAN FOR LITHIUM BROMIDE SYSTEMS	77
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	77
I273 PUMP DOWN UNITS OF REFRIGERATION OR AIR CONDITIONING SYSTEMS	77
F129 ALIGN MOTORS	77
F177 SOFT SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	77
F145 INSPECT GAUGES OR LINES	76
F174 REPLACE DRIER FILTERS OR CARTRIDGES	76
I288 REMOVE OR INSTALL ELECTRIC MOTORS	76
I292 REMOVE OR INSTALL FANS OR BLOWERS	75
F162 REMOVE OR INSTALL GAUGES	75
F156 REMOVE OR INSTALL BELT GUARDS	75
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	75
F130 ALIGN PULLEYS	73
I256 CHECK MOTORS FOR PROPER ROTATION	72
J317 CONNECT MOTORS TO ELECTRICAL POWER SOURCES	72

FIGURE 2

DISTRIBUTION OF FIRST-ENLISTMENT PERSONNEL
ACROSS JOB SPECIALTY GROUPS
(PERCENT MEMBERS RESPONDING)

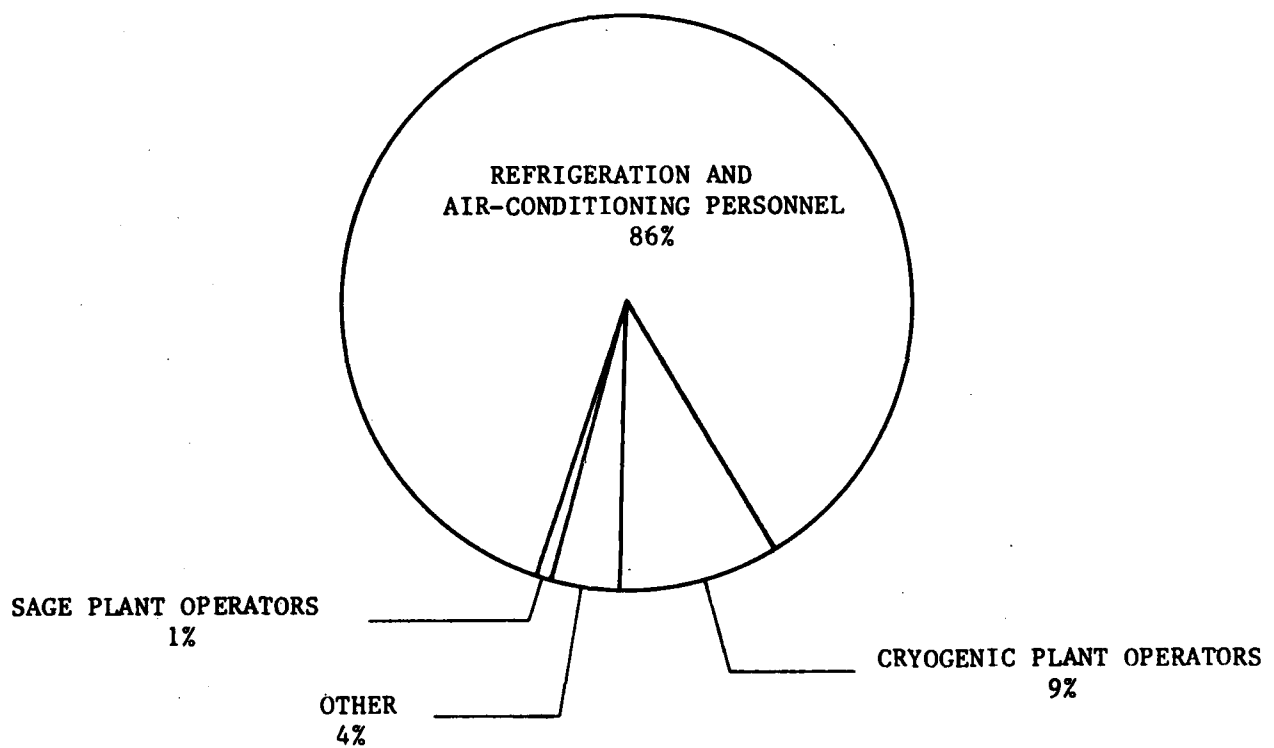


TABLE 14

JOB SATISFACTION INDICATORS BY TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)*

	1-48 MONTHS TAFMS		49-96 MONTHS TAFMS		97+ MONTHS TAFMS	
	545X0 (N=522)	COMPARATIVE SAMPLE** (N=2,888)	545X0 (N=266)	COMPARATIVE SAMPLE** (N=1,353)	545X0 (N=345)	COMPARATIVE SAMPLE** (N=2,080)
<u>EXPRESSED JOB INTEREST:</u>						
DULL	9	16	9	12	8	9
SO-SO	10	19	12	18	12	14
INTERESTING	79	64	76	69	78	75
<u>PERCEIVED USE OF TALENTS:</u>						
LITTLE OR NOT AT ALL	16	27	20	23	19	17
FAIRLY WELL TO PERFECTLY	84	73	80	76	80	82
<u>PERCEIVED USE OF TRAINING:</u>						
LITTLE OR NOT AT ALL	20	26	21	24	22	19
FAIRLY WELL TO PERFECTLY	80	73	79	76	77	80
<u>SENSE OF ACCOMPLISHMENT:</u>						
DISSATISFIED	13	21	17	21	18	19
AMBIVALENT	7	14	8	13	11	9
SATISFIED	80	64	75	65	70	72
<u>REENLISTMENT INTENTIONS:</u>						
WILL RETIRE	1	1	1	1	13	18
WILL NOT/PROBABLY WILL NOT REENLIST	42	59	21	31	8	10
WILL/PROBABLY WILL REENLIST	55	39	77	66	77	71

* COLUMNS MAY NOT EQUAL 100 PERCENT DUE TO NONRESPONSES AND ROUNDING

** COMPARATIVE SAMPLE OF DIRECT SUPPORT CAREER LADDERS SURVEYED IN 1982, INCLUDING AFSCs 12XXX, 22XXX, 23XXX, 25XXX, 39XXX, 47XXX, 51XXX, 54XXX, 55XXX, 56XXX, 57XXX, 59XXX, 60XXX, 61XXX, 62XXX, 63XXX, 64XXX, 75XXX, 81XXX, and 82XXX

ANALYSIS OF CONUS/OVERSEAS GROUPS

Comparisons of the background data and tasks performed were made between 5-skill level personnel assigned within the continental United States (CONUS) and overseas. Personnel in CONUS number 459, while those abroad total 212. The 2 groups are nearly equal in terms of average number of tasks performed (near the total sample average of 118), percentage of first-enlistment personnel (50 percent), and all job satisfaction indicators. The major difference in background data was not surprising: the distribution of personnel across MAJCOMs overseas (primary users are USAFE and PACAF) differs from the MAJCOM representation in CONUS (primary users are TAC, SAC, and ATC).

In comparing the duties of personnel in CONUS with those of their counterparts overseas, one difference is immediately apparent: the number of career ladder personnel overseas is approximately half cryogenics personnel. Thus, the complexion of the overseas assignment, as a whole, will reflect a much higher concentration of cryogenics-unique tasks and duties than will the assignments within CONUS (see Table 15). Within the refrigeration and air conditioning functional area alone, the only difference in duties observed was an increase in personnel performing maintenance on cooling towers within CONUS. The difference in numbers represents only a small difference in the amount of relative time spent, which is quite low for each group in comparison to other duties performed (see Table 16).

TABLE 15

REPRESENTATIVE TASK DIFFERENCES BETWEEN CONUS/OVERSEAS PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	CONUS 54550 (N=459)	OVERSEAS 54550 (N=212)	DIFFERENCE
K353 PERFORM COOLING TOWER SEASONAL MAINTENANCE	59	24	+35
K350 DRAIN COOLING TOWERS	64	35	+29
K351 ISOLATE COOLING TOWER MALFUNCTIONS	56	28	+28
K344 ADJUST DEPTH OF FLOATS IN COOLING WATER TANKS	51	27	+24
O442 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	2	29	-27
O430 GROUND CRYOGENIC EQUIPMENT, SUCH AS CRYOTAINERS OR PLANT SUPPORT EQUIPMENT	2	29	-27
N406 CONNECT OR DISCONNECT TRANSFER HOSES	3	30	-27
N419 PRODUCE CRYOGENIC PRODUCTS, SUCH AS GASEOUS AND LIQUID OXYGEN OR GASEOUS AND LIQUID NITROGEN	2	28	-26
N418 PERFORM PREOPERATIONAL OR DAILY INSPECTIONS OF PLANTS	2	28	-26
O435 PERFORM PERIODIC INSPECTIONS ON CRYOTAINERS	2	26	-24
E94 MAKE ENTRIES ON AVIATOR BREATHING OXYGEN SERVICING TRAILER LOG FORMS (AFTO FORMs 134)	1	26	-25

TABLE 16

REPRESENTATIVE TASK DIFFERENCES BETWEEN CONUS/OVERSEAS
REFRIGERATION AND AIR-CONDITIONING PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	CONUS 545X0 (N=637)	OVERSEAS 545X0 (N=230)	DIFFERENCE
K350 DRAIN COOLING TOWERS	65	28	+37
K353 PERFORM COOLING TOWER SEASONAL MAINTENANCE	62	28	+34
K351 ISOLATE COOLING TOWER MALFUNCTIONS	57	25	+32
K347 CLEAN COOLING TOWERS	68	37	+31
K344 ADJUST DEPTH OF FLOATS IN COOLING WATER TANKS	55	25	+30
K358 START UP OR SHUT DOWN COOLING WATER SYSTEMS	60	31	+29

ANALYSIS OF MAJCOM GROUPS

The background data of and tasks performed by personnel in the six MAJCOMs with populations above five percent--TAC, SAC, USAFE, PACAF, MAC, and ATC were compared to determine whether job content varied as a function of MAJCOM assignment. One of the major reasons for such a comparison is to detect differences in the jobs of first-enlistment personnel across MAJCOMs that might affect technical training. Table 17 compares duty differences across MAJCOMs for this group.

Analysis of duties and tasks performed and background data, shows that all MAJCOMs were generally similar. The only difference of note is the increase in cryogenics duties evident in USAFE and PACAF. Because of their location and necessity to produce, rather than purchase, liquid oxygen, these are the primary MAJCOMs to which cryogenics personnel are assigned. Other than this, no major differences appear between MAJCOMs in this comparison.

TABLE 17

RELATIVE PERCENT TIME SPENT ON DUTIES BY FIRST-ENLISTMENT MAJCOM GROUPS

DUTIES	1-48 MONTHS TAFMS					
	TAC (N=105)	SAC (N=110)	USAFE (N=71)	PACAF (N=66)	ATC (N=37)	MAC (N=46)
A ORGANIZING AND PLANNING	*	*	*	1	*	*
B DIRECTING AND IMPLEMENTING	*	1	1	1	1	*
C INSPECTING AND EVALUATING	*	*	*	*	*	*
D TRAINING	*	*	*	*	2	*
E MAINTAINING FORMS, LOGS, AND RECORDS	3	2	4	5	1	2
F PERFORMING GENERAL REFRIGERATION, AIR CONDITIONING, OR CRYOGENIC DUTIES	34	36	31	35	35	32
G MAINTAINING AIR CONDITIONING SYSTEMS	12	11	7	10	13	11
H MAINTAINING REFRIGERATION SYSTEMS OTHER THAN IN CRYOGENIC PLANTS	8	10	9	7	8	8
I MAINTAINING REFRIGERATION, AIR CONDITIONING, OR CRYOGENIC PLANT MAJOR COMPONENTS	20	18	15	18	19	18
J MAINTAINING CONTROL SYSTEMS	11	10	8	9	9	10
K MAINTAINING COOLING TOWERS	4	5	3	2	6	5
L MAINTAINING REFRIGERANT OR AIR COMPRESSORS	5	6	6	5	5	6
M INSTALLATION OR REMOVAL OF CRYOGENIC (LOX) PLANTS	*	*	*	*	*	*
N OPERATING CRYOGENIC (LOX) PLANTS	1	*	10	5	*	2
O OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	1	*	5	2	1	5

*DENOTES LESS THAN ONE PERCENT

TRAINING ANALYSIS

Occupational survey data are used to assist in the development of a training program relevant to the needs of personnel working in their first assignment within a career ladder. Factors which may be used in evaluating training are the percent of first-job (1-24 months TAFMS) or first-enlistment (1-48 months TAFMS) members performing tasks, along with training emphasis and task difficulty ratings (previously explained in the SURVEY METHODOLOGY section). These factors were used in evaluating the Specialty Training Standard (STS) and the Plans of Instruction (POIs) for the 545X0 career ladder. Technical school personnel from the Sheppard Technical Training Center, Sheppard AFB, Texas, matched inventory tasks to appropriate sections of the STS and the POI for Course J3ABR54530, Refrigeration and Cryogenics, dated December 1980, with change dated August 1981. Technical school personnel from the Chanute Technical Training Center, Chanute AFB, Illinois, also matched tasks to appropriate sections of the STS as well as the POI for Course C3AZR54550, Cryogenics Operations, dated 31 July 1980. The two STS matchings were collated by the Data Applications unit of OMY. It is the resulting STS matching and those of the two POIs upon which comparisons are based. It should be noted that comments and tables presented in this section pertaining to questionable elements (or lack of elements) in the training documents are intended to highlight what appear to be possible problem areas. A complete computer listing reflecting the percent members performing, training emphasis ratings, and task difficulty ratings for each task, along with STS and POI matchings, has been forwarded to the technical schools for their use in further detailed reviews of training documents. A summary of that information is described below.

Training Emphasis

Table 18 lists the top 20 tasks which refrigeration and air conditioning raters indicated were the most important for first-enlistment training (as indicated by TE ratings). These data are displayed to provide the reader with a perspective on the types of tasks which are more important for training. These tasks deal primarily with general refrigeration and air conditioning maintenance and all but two are performed by a majority of first-enlistment personnel. This indicates that all are well suited for some form of common structured training unless other factors override such considerations. In all, 90 of the 442 inventory tasks were rated high in TE.

Table 19 lists the top 20 tasks which cryogenics raters indicated were the most important for first-enlistment training. These tasks deal primarily with the operation and maintenance of cryogenics plants and equipment, and all are performed by over 60 percent of first-enlistment Cryogenics personnel. This indicates that all are well suited for some form of common structured training unless other factors override such considerations. A further review of these tasks indicates all were matched to C3AZR54550 POI, indicating they are currently taught in the technical school. In all, 71 of the 442 inventory tasks were rated high in TE.

Specialty Training Standard

A comprehensive review of STS 545X0, dated July 1980, was made comparing STS items to survey data. STS paragraphs containing general information or subject-matter knowledge requirements were not evaluated. The STS generally provides comprehensive coverage of the significant jobs performed and equipment maintained by personnel in the field, with survey data supporting significant paragraphs or subparagraphs. Several areas of concern need to be reviewed.

STS subparagraph 6a(2), entitled Recurring Maintenance Program (RMP), shows no proficiency code for 3-skill level personnel. Of the six inventory tasks matched here, two have very high TE ratings, and over 70 percent of the first-enlistment personnel performing. Five-skill level personnel perform these tasks in the same percentages, with a B (subject knowledge) proficiency code. Subject-matter specialists and training personnel should review this subparagraph to determine if the proficiency code should be raised to either a B or B/- level, which seems justified by tasks performed and TE ratings.

STS paragraph 21j, entitled Centrifugal Air Conditioning System, shows no proficiency code for 3-skill level personnel. Of the two inventory tasks matched here, one has a high TE rating, both have very high TD ratings by both refrigeration and air conditioning and cryogenics raters, and the tasks have one-fifth to one-third of first-job and first-enlistment personnel performing them. Based on this information and the STS section as a whole, subject-matter specialists and training personnel should review this paragraph to determine if the proficiency code should be raised to either a 1a or 1b level, which seems justified based on this data.

A number of paragraphs in the STS with task performance proficiency codes assigned did not have inventory tasks matched to them. This could mean that an applicable task has not been matched, the element is inappropriately coded as a performance item rather than a knowledge item, or that there are no clearly defined inventory tasks appropriate to that element. Subject-matter specialists and training personnel should review these elements in detail to assure that inclusion is justified. If that is the case, the possible reason for the unmatched elements discussed above should be pursued and necessary adjustments made. (If it is determined there are no tasks in the inventory which can be matched to a valid performance element, it is requested that the subject-matter specialists draft the appropriate task statements and forward them to the Occupational Measurement Center for review and use in the next inventory rewrite.)

Tasks which were not matched to any element of the STS are listed at the end of the STS computer format. These 50 tasks were reviewed to determine if they were concentrated around a common function. No particular trend or functional group of these tasks was noted; most showed relatively few people performing them and low TE ratings and probably do not warrant structured training. Subject-matter specialists and training personnel should evaluate these tasks to determine if coverage of any of the tasks is justified in the STS. Table 20 displays a listing of examples of the unmatched tasks.

Plan of Instruction

Based on the previously mentioned assistance from technical school subject-matter specialists in matching inventory tasks to the two POIs, computer products were generated displaying the results of that matching process. Information furnished for consideration includes TE and TD ratings, as well as percent members performing data for first-job (1-24 months TAFMS) and first-enlistment (1-48 months TAFMS) personnel.

Although a more recent J3ABR54530 POI became effective in November 1982, Sheppard training personnel used the older POI when matching inventory items. This creates more inconvenience than problems, since a major difference in the two POIs is arrangement rather than content. However, in light of this oversight, the training community should reevaluate the current match with the new POI to consider how changes in structure might affect data matches and, ultimately, training implications. In general, a review of the POI match indicates current training is well justified, based on percent of first-job and first-enlistment personnel performing the tasks matched, their TE and TD ratings, and the nature of the subject matter. Subject-matter specialists and training personnel should review the lack of inventory task matches to Blocks III and VI in particular, to determine whether applicable tasks were not matched or no inventory tasks appropriate to those elements exist.

Subject-matter specialists and training personnel should also evaluate the large number of tasks not matched to this POI, to determine if matches to the POI are justified. Many tasks (particularly the supervisory and cryogenics ones) will not be matched, but some others may. Few of the unmatched tasks were rated high in TE. There are, however, six notable exceptions displayed in Table 21. Due to their nature, two of these (G209 and H235) may not match directly to any one POI block of instruction; the corresponding STS paragraph, shown as a subject-knowledge item, was noted in the discussion above. Task G200, rated high in TE and very high in TD, with sizable numbers performing, was also unmatched; its STS proficiency code is dashed and, it too, was discussed earlier. The three remaining unmatched tasks with high TE are identified by the STS for training at the b-level. These, as well as other tasks, should be reviewed again in light of the tasks, TE, and TD data.

The C3AZR54550 POI match was reviewed, in conjunction with the survey data. Overall, the match seemed complete and accurate. Subject-matter specialists and training personnel might look again at two small sections of the POI--II.2A and IV.3E--as the inventory tasks matched to them have TEs below or only slightly above average, some TDs which are low, and very low percentages of people performing the tasks. These, it may be concluded, might be better handled through OJT.

The long list of tasks not matched to this POI should also be reviewed to ensure that matches are not justified; most of these will probably be left unmatched, as they pertain to supervisory jobs or were covered in the J3ABR54530 POI. Only 11 unmatched tasks (displayed in Table 22) were rated high in TE, and 7 of these were covered in the course at Sheppard. Of the four remaining, one (F183) showed low percent members performing and was not matched to the STS; the three others (E94, E116, and I271) were matched

to the STS with task knowledge and performance proficiency codes, and one had high percentages of first-job and first-enlistment performers. These, in particular, should be reviewed.

The evaluation of subject matter, tasks, and issues discussed here is essential in an effort to determine the necessity for training and the most effective method to accomplish it.

TABLE 18

TASKS RATED HIGHEST IN TRAINING EMPHASIS BY REFRIGERATION AND AIR-CONDITIONING RATERS

TASKS	TRAINING EMPHASIS*	PERCENT MEMBERS PERFORMING		TASK DIFFICULTY**
		FIRST-ENLISTMENT (N=522)	TOTAL SAMPLE (N=1,139)	
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	7.00	84	79	5.43
J329 PERFORM CONTINUITY CHECKS	6.91	70	69	4.30
G186 CHARGE AIR CONDITIONING OR REFRIGERATION SYSTEMS WITH REFRIGERANT OTHER THAN FOR LITHIUM BROMIDE SYSTEMS	6.83	77	70	6.00
G204 ISOLATE MALFUNCTIONS WITHIN RECIPROCATING COMPRESSION AIR CONDITIONING SYSTEMS	6.61	46	46	6.42
H233 ISOLATE MALFUNCTIONS WITHIN REFRIGERATION SYSTEMS, SUCH AS TO COMPRESSORS, ELECTRICAL SYSTEMS, OR CONDENSERS	6.61	70	63	6.10
G203 ISOLATE MALFUNCTIONS WITHIN PACKAGE AIR CONDITIONING UNITS	6.35	58	55	6.44
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	6.30	74	68	4.62
F178 SWAGE COPPER TUBING	6.22	71	63	3.92
J322 ISOLATE ELECTRICAL CIRCUIT MALFUNCTIONS	6.17	63	62	6.15
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	6.13	77	71	4.79
J323 ISOLATE ELECTRICAL CONTROL SYSTEM MALFUNCTIONS	6.09	52	54	6.38
J337 REMOVE OR INSTALL ELECTRICAL WIRING	6.09	68	64	5.31
F130 ALIGN PULLEYS	6.04	73	68	5.50
F144 FLARE COPPER TUBING	6.04	86	79	4.19
F129 ALIGN MOTORS	6.00	76	72	5.70
G208 ISOLATE MALFUNCTIONS WITHIN WINDOW AIR CONDITIONING UNITS	5.96	62	56	5.32
I269 LOCATE REFRIGERANT LEAKS USING SOAP SOLUTIONS	5.96	82	75	3.74
J331 PERFORM OPERATIONAL CHECKS OF PNEUMATIC OR ELECTRICAL CIRCUITS	5.91	42	41	5.96
H235 PERFORM RECURRING MAINTENANCE PROGRAM ON REFRIGERATION SYSTEMS OTHER THAN CRYOGENICS	5.83	70	62	4.57
H245 START UP OR SHUTDOWN REFRIGERATION SYSTEMS	5.83	70	62	4.68

* TASKS RATED ABOVE 4.51 ARE HIGH IN TRAINING EMPHASIS

** TASK DIFFICULTY RATING OF 5.00 IS AVERAGE

TABLE 19

TASKS RATED HIGHEST IN TRAINING EMPHASIS BY CRYOGENICS RATERS

TASKS	TRAINING EMPHASIS*	PERCENT MEMBERS PERFORMING			TASK DIFFICULTY**
		FIRST-ENLISTMENT (N=46)	TOTAL CRYOGENICS (N=116)		
N419	PRODUCE CRYOGENIC PRODUCTS, SUCH AS GASEOUS AND LIQUID OXYGEN OR GASEOUS AND LIQUID NITROGEN	7.79	87	86	5.74
N424	SHUTDOWN LOX PLANTS	7.71	89	86	5.59
N408	ESTABLISH AIR FLOW THROUGHOUT PLANT	7.57	89	85	5.12
N417	PERFORM ODOR TESTS	7.36	91	90	3.73
N418	PERFORM PREOPERATIONAL OR DAILY INSPECTIONS OF PLANTS	7.36	84	85	4.53
N413	MAINTAIN PRODUCT PURITY DURING PRODUCTION	7.29	87	86	5.51
N420	REACTIVATE ABSORBERS OR PURIFIERS	7.29	87	84	4.80
N407	DEFROST PLANTS	7.21	82	84	5.52
N425	START UP LOX PLANTS	7.14	87	84	5.59
O442	TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	7.14	93	94	4.46
N423	SET VALVES FOR LOX PLANT STORAGE	7.07	84	78	4.66
N410	FILL COSMODYNE SAMPLES	7.00	91	88	4.76
N412	ISOLATE AIR SEPARATION SYSTEM MALFUNCTIONS	6.79	63	70	6.29
N414	MIX PRODUCT PURITY TEST SOLUTIONS	6.79	87	85	4.47
N416	PERFORM LIQUID PRODUCT PARTICULATE TESTS	6.79	60	65	3.63
N411	INSPECT CONDITION OF GAS STORAGE CYLINDERS	6.64	78	79	4.97
O430	GROUND CRYOGENIC EQUIPMENT, SUCH AS CRYOTAINERS OR PLANT SUPPORT EQUIPMENT	6.64	95	96	3.54
N422	SET UP OR OPERATE PRODUCT PURITY TEST SETS	6.57	95	91	4.60
O433	OPERATE VACUUM PUMPS	6.57	87	93	4.43
O427	CHECK VACUUM IN CRYOTAINERS	6.50	80	88	4.42

* TASKS RATED ABOVE 4.35 ARE HIGH IN TRAINING EMPHASIS

** TASK DIFFICULTY RATING OF 5.00 IS AVERAGE

TABLE 20

EXAMPLES OF TASKS NOT MATCHED TO STS 545X0

TASKS	REF/AC TRAINING EMPHASIS*	CRYOGENICS TRAINING EMPHASIS**	PERCENT MEMBERS PERFORMING	
			FIRST- JOB (N=225)	FIRST- ENLISTMENT (N=522)
F160 REMOVE OR INSTALL ELECTRICALLY OPERATED VALVES	4.56	2.86	50	51
F183 WELD LOW PRESSURE LINES OR FITTINGS UNDER 500 PSI	4.22	4.50	37	38
G317 REMOVE OR INSTALL HUMIDIFIER COMPONENTS	4.22	.57	24	31
G218 REMOVE OR INSTALL HUMIDITY EQUIPMENT COMPONENTS	4.22	.57	22	29
G190 INSPECT HUMIDITY EQUIPMENT	4.17	.64	36	41
G191 INSPECT REHEATING SYSTEMS	3.96	.64	21	26
F152 MEASURE AND CUT PIPES	3.91	3.93	48	48
G188 CLEAN HUMIDIFIERS	3.26	1.07	29	33
G207 ISOLATE MALFUNCTIONS WITHIN SCREW-TYPE COMPRESSOR AIR CONDITIONING SYSTEMS	2.61	.93	9	10
G223 REMOVE OR INSTALL SCREW-TYPE COMPRESSOR AIR CONDITIONING SYSTEM COMPONENTS	2.61	.64	8	8
F181 THREAD PIPES	2.48	3.86	28	31
G219 REMOVE OR INSTALL LITHIUM BROMIDE ABSORPTION SYSTEM COMPONENTS	2.26	.79	8	8
F182 WELD HIGH PRESSURE LINES OR FITTINGS OVER 500 PSI	2.17	2.57	13	13
H231 CALCULATE HEAT LOADS	1.74	.29	17	17
I277 REMOVE OR INSTALL BATTERIES	1.52	2.50	12	12
A2 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	1.26	1.00	1	3
I249 ADJUST CLUTCH ON POWER TAKEOFF UNITS	1.22	3.21	2	3
D90 WRITE TEST QUESTIONS	1.13	.21	3	3
E101 MAKE ENTRIES ON BASE FUELS SAMPLING AND TESTING RECORD FORMS (AFTO FORMs 150)	1.13	3.79	5	5
I254 ADJUST POWER TAKEOFF OR PRODUCT PUMP TAPER ROLLER BEARINGS	1.09	3.79	4	3

* TASKS RATED ABOVE 4.51 ARE HIGH IN REFRIGERATION AND AIR CONDITIONING TRAINING EMPHASIS

** TASKS RATED ABOVE 4.35 ARE HIGH IN CRYOGENICS TRAINING EMPHASIS

TABLE 21

TASKS HIGH IN TRAINING EMPHASIS NOT REFERENCED TO J3ABR54530 POI

TASKS	TRAINING EMPHASIS*	PERCENT MEMBERS PERFORMING		TASK DIFFICULTY**
		FIRST- JOB (N=225)	FIRST- ENLISTMENT (N=522)	
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	6.30	72	74	4.62
H235 PERFORM RECURRING MAINTENANCE PROGRAM ON REFRIGERATION SYSTEMS OTHER THAN CRYOGENICS	5.83	69	70	4.57
J319 INSPECT PNEUMATIC OR ELECTRICAL CONTROLS FOR SAFETY	5.65	28	32	4.75
I278 REMOVE OR INSTALL BEARINGS OR BUSHINGS, SUCH AS IN MOTORS COMPRESSORS, PUMPS, OR SHAFTS	5.44	64	70	5.49
G200 ISOLATE MALFUNCTIONS WITHIN CENTRIFUGAL AIR CONDITIONING SYSTEMS	4.70	31	34	7.41
I289 REMOVE OR INSTALL EVAPORATORS	4.56	45	47	4.98

* TASKS RATED ABOVE 4.51 ARE HIGH IN TRAINING EMPHASIS

** TASK DIFFICULTY RATING OF 5.00 IS AVERAGE

TABLE 22

TASKS HIGH IN TRAINING EMPHASIS NOT REFERENCED TO C3AZR54550 POI

TASKS	TRAINING EMPHASIS*	PERCENT MEMBERS PERFORMING		TASK DIFFICULTY**
		FIRST-JOB (N=21)	FIRST-ENLISTMENT (N=46)	
E94 MAKE ENTRIES ON AVIATOR BREATHING OXYGEN SERVICING TRAILER LOG FORMS (AFTO FORMs 134)	5.79	76	76	2.89
F177 SOFT SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	5.64	14	34	5.29
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	5.14	28	37	5.85
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING, OR PAINTING	5.07	85	93	3.50
E116 MAKE ENTRIES ON CRYOGENIC MATERIALS SAMPLE FORMS (AFTO FORMs 176)	4.71	19	32	3.65
F144 FLARE COPPER TUBING	4.71	42	60	4.00
F183 WELD LOW PRESSURE LINES OR FITTINGS UNDER 500 PSI	4.50	4	13	5.80
F151 MEASURE AND CUT COPPER TUBING	4.43	33	54	3.84
F157 REMOVE & INSTALL BELTS	4.43	47	56	4.29
I271 PACK VALVES OTHER THAN EXPANSION ENGINE VALVES	4.36	19	43	5.00
K347 CLEAN COOLING TOWERS	4.36	47	47	3.99

* TASKS RATED ABOVE 4.35 ARE HIGH IN TRAINING EMPHASIS

** TASK DIFFICULTY RATING OF 5.00 IS AVERAGE

COMPARISON TO PREVIOUS SURVEYS

Results of this survey were compared to the results of OSRs AFPT 90-545-274 (Refrigeration and Air Conditioning and Heatings Systems Career Ladders), dated 30 September 1977, and AFPT 90-544-315 (Cryogenics Fluids Production Career Ladder), dated June 1978. Comparisons were made to career ladder structures (Table 23) and job satisfaction indicators by TAFMS groups (Table 24). Although the 1977 survey included the Heating Systems career ladder (AFS 547X0) and Mechanical Superintendents (AFSC 54790), only Refrigeration and Air Conditioning career ladder personnel (AFS 545X0) appear in comparison data, unless otherwise indicated.

Other than the merging of the two career ladders into a single AFSC, the two functional areas, clearly identified in this study, seem to have undergone little change. Refrigeration and Air Conditioning personnel appear in both the 1983 and 1977 surveys, each with their respective supervisors forming separate clusters. Several additional job types within these clusters, as well as one independent job type, were identified in this survey. Cryogenics job types within the clusters were easily matched between this survey and the previous one of that AFSC. Only three minor differences were identified. First was the identification in 1978 of a separate job type of 1½-Ton Generating Plant Specialists; in the current survey, no difference was seen between these and personnel who work 5-ton generating plants, and they are indistinguishable within the cluster description. Second was the appearance of the cryogenics administrative personnel in this survey which had no counterpart in the last. Finally was the absence in this study of any group whose time was purely devoted to cryogenics supervision, as was the 1978 independent job type of Senior Cryogenics Supervisor; all cryogenics supervisory personnel in this survey were grouped within the cluster and indicated a more sizable portion of their time performing production, storage, and maintenance duties. Other than these small differences, the career ladder structures remain similar within a merged AFSC.

Indicators of job satisfaction, utilization of talents and training, and reenlistment intentions across the three surveys were also reviewed. Job satisfaction and utilization indicators between similar TAFMS groups were comparable. Reenlistment intentions for first-enlistment groups have increased since earlier surveys; a very big rise in positive intentions to reenlist is seen for refrigeration and air conditioning personnel in their second-plus enlistments since the 1977 survey.

TABLE 23

JOB SPECIALTY COMPARISONS ACROSS CURRENT AND PREVIOUS SURVEYS

<u>1983 OSR (545X0)</u>	<u>1978 OSR (544X0)</u>	<u>1977 OSR (545X0/547X0/54790)</u>
REFRIGERATION AND AIR CONDITIONING PERSONNEL (N=877)	NA*	REFRIGERATION AND AIR CONDITIONING SPECIALISTS (N=962)
REFRIGERATION AND AIR CONDITIONING FIRST-LINE SUPERVISORS (N=48)	NA	NI**
AIR-CONDITIONING SUPPORT PERSONNEL (N=72)	NA	NI
HVAC PERSONNEL (N=7)	NA	NI
CRYOGENICS PLANT OPERATORS (N=116)	GENERATING PLANT PERSONNEL CLUSTER (N=128) INCLUDING GENERATING PLANT OPERATORS- MAINTAINERS (N=93)	NA
CRYOGENICS FIRST-LINE SUPERVISORS (N=38)	CRYOGENIC PLANT NCOICs (N=7)	NA
CRYOGENICS PRODUCTION NCOICs (N=8)	CRYOGENIC PLANT SUPERVISORS (N=5)	NA
CRYOGENICS STORAGE NCOICs (N=9) AND CRYOGENICS STORAGE OPERATORS (N=5)	LOX STORAGE AND SUPPORT EQUIPMENT SPECIALISTS (N=13)	NA
NI	1½-TON GENERATING PLANT SPECIALISTS (N=5)	NA

TABLE 23 (CONTINUED)

JOB SPECIALTY COMPARISONS ACROSS CURRENT AND PREVIOUS SURVEYS

	1983 OSR (545X0)	1978 OSR (544X0)	1977 OSR (545X0/547X0/54790)
SUPERVISORS (N=62)		NA	SUPERVISORY PERSONNEL (545X0/547X0/ 54790) (N=216)
REFRIGERATION AND AIR CONDITIONING SHOP SUPERVISORS (N=20)		NA	NI
MECHANICAL SUPERINTENDENTS (N=25)		NA	MECHANICAL SUPERINTENDENTS (54790)
CRYOGENICS ADMINISTRATIVE PERSONNEL (N=6)		NI	NA
NI		SENIOR CRYOGENICS SUPERVISORS (N=12)	NA
SAGE PLANT OPERATORS (N=10)		NA	NI
TECHNICAL TRAINING INSTRUCTORS (N=6)		NI	TRAINING INSTRUCTORS (545X0/547X0) (N=24)

* NA= NOT APPLICABLE

** NI= NOT IDENTIFIED

TABLE 24

JOB SATISFACTION INDICATORS BY TAFMS GROUPS AND PREVIOUS SURVEYS

	1-48 MONTHS TAFMS			49+ MONTHS TAFMS		
	545X0 (1983)	544X0 (1978)	545X0 (1977)	545X0 (1983)	544X0 (1978)	545X0 (1977)
<u>EXPRESSED JOB INTEREST</u>						
DULL	9	10	8	8	17	9
SO-SO	10	21	14	12	13	11
INTERESTING	79	62	70	77	64	72
<u>PERCEIVED USE OF TALENTS:</u>						
LITTLE OR NOT AT ALL	16	29	21	19	23	20
FAIRLY WELL TO PERFECTLY	84	71	77	80	75	78
<u>PERCEIVED USE OF TRAINING:</u>						
LITTLE OR NOT AT ALL	20	12	23	22	19	23
FAIRLY WELL TO PERFECTLY	80	88	76	78	80	76
<u>REENLISTMENT INTENTIONS:</u>						
WILL NOT/PROBABLY WILL NOT REENLIST	42	45	51	14	22	62
WILL/PROBABLY WILL REENLIST	55	45	36	77	76	25

* COLUMNS MAY NOT EQUAL 100 PERCENT DUE TO NONRESPONSE OR ROUNDING

SPECIAL CONSIDERATIONS

Since the request from HQ AFMPC to evaluate the effect of the merger of the two career ladders into the present 545X0 AFSC, several questions have been raised concerning the appropriateness of the two functional areas within one AFSC. While not every issue raised lends itself to empirical study, USAFOMC can provide certain useful data to aid in that decision-making process. This section is devoted to discussing some of those concerns which may be addressed through the analysis of data collected through the current survey.

Job Satisfaction. One of the recurring arguments against the present career ladder is the supposedly rampant dissatisfaction in the field among both refrigeration and air conditioning personnel, and cryogenics personnel; neither of these groups, the argument goes, is happy doing (or living with the prospect of doing) the job of the other, which is always a possibility under the merged AFSC. While the dissatisfaction idea is being advanced by those seeking the division of the AFSC, the findings of this survey tend to discount the idea.

First, as was discussed in the SPECIALTY JOBS, ANALYSIS OF DAFSC GROUPS, and ANALYSIS OF TAFMS GROUPS sections, job satisfaction indicators for the career ladder indicate a high amount of job satisfaction and sense of accomplishment in the work being done. Low numbers in these two areas were apparent in several job types, but these are probably associated with specific jobs in different clusters wherein a small number of incumbents perform few tasks. Most respondents across job types and TAFMS groups feel their talents and training are at least fairly well utilized. Reenlistment intentions, another indicator, are generally high, as well.

Second, in comparing job satisfaction indicators of 545X0 personnel to those of AFSCs functionally similar (based on mission and type of job, and including the Fuels and Supply career ladders), few differences were found. Overwhelmingly, where differences were found, the indicators for the 545X0 career ladder personnel were higher than for those of like-TAFMS groups in the comparative sample.

Third, a comparison of job satisfaction indicators for this survey sample and both AFSCs sampled before the merger tends to show an improved perception of the job since the earlier OSRs. Reenlistment intentions, in particular, have increased noticeably, (although this increase may be in part a function of the economy since a similar increase has been noted in other specialties).

Fourth, as discussed earlier, the lack of write-in comments further demonstrates the absence of job dissatisfaction in the career ladder.

Finally, to completely evaluate the matter, a comparison was done between the indicators of personnel across the combinations of previous AFSCs and present functional areas. Respondents were divided into four groups: those who, before the merger, held the 544X0 or 545X0 AFSC and

who are now in the cryogenics or refrigeration and air conditioning functional area. Such an analysis provides information about important subgroups of the AFSC which were or were not directly affected by the merger; the groups and their indicators appear in Table 25. Job satisfaction indicators for the groups are generally high, particularly in the areas of utilization of talents and training and reenlistment intentions. Notable exceptions appear in responses of the cryogenics group with no previous cryogenics AFSC. These figures, it is believed, are skewed downward due to the high number of new cryogenics personnel (over 30 percent have less than 2 years TAFMS and thus, no previous AFSC) assigned to the storage operations (with relatively few and simple tasks and low job satisfaction ratings previously discussed). Even so, reenlistment intentions for this small group remain relatively high.

In short, job satisfaction indicators of this study tend to contradict any argument of high dissatisfaction. It is definitely not supported as a basis for any classification change within the career ladder.

Experience. The issue of rapidly declining experience in the cryogenics functional area has been raised and tends to be confirmed through the comparison of past and present OSR data (see Table 26). At the time of the 1978, 544X0 OSR, the most senior cluster of cryogenics supervisors averaged more than 11 years TICF and about 17 years TAFMS. By contrast, the most senior cryogenics supervisors in this study have served in cryogenics positions for a little more than six years. Production supervisors have about the same experience, with less TAFMS. Cryogenics supervisors, as a whole, now average only 5 years in that functional area, compared with nearly 10 years at the time of the previous survey. (Refrigeration supervisors average over 12 years in the refrigeration functional area, by comparison.) Thus, the experience of the supervisors seen here is not much more than that of the cluster as a whole (just under four years in cryogenics) and barely covers the three-to-five years experience (an informal and unofficial consensus) necessary to effectively supervise cryogenic production operations.

Commonality of tasks. Another question that has been raised is how much commonality exists between the two functional areas within this AFSC. This issue, obviously, would have been discussed prior to the merger of the two previous AFSCs, but now, through current OSR data, further comparisons may be made. As discussed earlier, inventory tasks are grouped under duty headings, based on commonality of tasks and functions. Responses to the task statements were analyzed across the Refrigeration and Air Conditioning Personnel and Cryogenics Plant Operators clusters to determine what amount of commonality exists between the jobs (see Table 27).

The first four duty titles (A through D) contain supervisory tasks. Very little difference between the groups exists in the tasks identified here, although the percentages of cryogenics personnel performing the various tasks and the relative time they spend are slightly higher. This results from the fact that the cryogenics supervisory personnel are identified within this cluster, unlike the refrigeration and air conditioning supervisory personnel, who appear in a cluster of their own. The maintenance of forms, logs, and records (Duty E) also requires more of the Cryogenics cluster's attention due

to their unique requirements for quality control. While all of these duties (A through E) require more relative time spent by cryogenics personnel than by refrigeration and air conditioning personnel, the overall difference is small.

Tasks grouped under the duty headings F, I, J, K, and L are those likely to be performed by members of either cluster. Much of the career ladder's time is spent performing general technical duties common to both functional areas. Both clusters are spending similar amounts of time on tasks relating to general duties (Duty F), maintenance of major plant components, cooling towers, and refrigerant or air compressors (Duties I, K, and L). Further, similar percentages of personnel from each cluster are performing many of the tasks included in those duties. Good degrees of commonality are seen in maintenance tasks, such as aligning motors, removing and installing couplings, various tasks related to handling copper tubing, and draining and cleaning cooling towers; examples of these tasks are shown in Table 28. Many of the tasks performed by both clusters are taught in the J3ABR54530 course for all 545X0 personnel, and, appropriately, are not repeated in the C3AZR54550 course for cryogenics personnel. Table 29 displays examples of those tasks. Generally, the tasks which are performed by more refrigeration and air conditioning personnel involve working with electric motors and evaporators (Duty I), pulleys (Duty F), and electrical and pneumatic circuitry and controls (Duty J). Of the tasks which more cryogenics personnel performed, most dealt with compressors.

Certain tasks, of course, are unique to one of the two functional areas. Tasks that are purely refrigeration and air conditioning are grouped in Duties G and H; tasks that are solely cryogenics are found in Duties M, N, and O. Not surprisingly, personnel in the two functional areas of this study responded to tasks in their respective areas of performance to the exclusion of those tasks in the area of the other functional group. Based on these responses, it is seen that the exclusively refrigeration and air conditioning tasks account for only about 20 percent of that cluster's relative time; exclusively cryogenics tasks account for about one-third of that cluster's relative time.

Differences between the functional areas do exist. Such a conclusion is not surprising, based on what has been discussed in this OSR alone. The differences themselves, however, are not, it seems, detrimental to the career ladder as a whole. In fact, these differences can be quite positive if the career ladder is managed effectively. An example of such effective administration was seen in the TRAINING ANALYSIS section, in how the cryogenics technical training course builds on the foundation laid by the refrigeration technical training course. It is such commonality between tasks and the compatibility between functions--not the differences--that stand out distinctly. In short, the commonality warrants a close working relationship between the two functional areas within this AFSC.

Summary of Special Considerations. The special considerations of this study, discussed above, tend to suggest two conclusions. First, there is enough commonality and job satisfaction between the refrigeration and cryogenics functional areas within the AFSC to support their current close relationship. Second, the differences that exist tend to suggest a greater amount of specialization and, thus, the need for greater experience and stability in the cryogenics area. Specifically, this suggests a requirement for an increase in the cryogenics experience of cryogenics supervisory personnel.

TABLE 25

JOB SATISFACTION INDICATORS BY FUNCTIONAL/PREVIOUS FUNCTIONAL GROUPS
(IN PERCENT)*

TOTAL 545X0 SAMPLE (N=1,139)	CRYOGENIC FUNCTIONAL AREA		REFRIG/AC FUNCTIONAL AREA	
	PREV CRYOGENICS AFSC (N=65)	NO PREV CRYOGENICS AFSC (N=58)	PREV CRYOGENICS AFSC (N=57)	NO PREV CRYOGENICS AFSC (N=880)
<u>EXPRESSED JOB INTEREST:</u>				
DULL	9	31	9	7
SO-SO	11	19	11	10
INTERESTING	78	46	79	80
<u>PERCEIVED USE OF TALENTS:</u>				
LITTLE OR NOT AT ALL	18	33	16	17
FAIRLY WELL TO PERFECTLY	82	66	84	83
<u>PERCEIVED USE OF TRAINING:</u>				
LITTLE OR NOT AT ALL	21	28	25	20
FAIRLY WELL TO PERFECTLY	79	72	75	80
<u>SENSE OF ACCOMPLISHMENT:</u>				
DISSATISFIED	16	31	28	14
AMBIVALENT	8	26	2	7
SATISFIED	76	43	70	79
<u>REENLISTMENT INTENTIONS:</u>				
WILL RETIRE	5	0	9	5
WILL NOT/PROBABLY WILL NOT REENLIST	27	29	32	28
WILL REENLIST/PROBABLY WILL REENLIST	67	69	58	66

* COLUMNS MAY NOT EQUAL 100 PERCENT DUE TO NONRESPONSE OR ROUNDING

TABLE 26

EXPERIENCE OF FUNCTIONAL GROUPS FOR CURRENT AND PREVIOUS SURVEYS

	<u>AVERAGE TIME IN FUNCTIONAL AREA (IN YEARS)</u>			
	<u>REFRIGERATION AND AIR CONDITIONING</u>		<u>CRYOGENICS</u>	
	<u>CURRENT (1983)</u>	<u>PREVIOUS (1977)</u>	<u>CURRENT (1983)</u>	<u>PREVIOUS (1978)</u>
TOTAL FUNCTIONAL AREA	4.3	4.6	3.7	5.2
TOTAL SUPERVISORS WITHIN FUNCTIONAL AREA	12.4	*	5.0	9.9
MOST SENIOR SUPERVISOR GROUP IDENTIFIED	14.8	*	6.4	11.3

*DATA NOT AVAILABLE

TABLE 27

RELATIVE TIME SPENT ON DUTIES BY FUNCTIONAL GROUPS

DUTIES	REFRIG/AC PERSONNEL CLUSTER (N=877)	CRYOGENIC PLANT OPR CLUSTER (N=116)
A ORGANIZING AND PLANNING	1	3
B DIRECTING AND IMPLEMENTING	2	3
C INSPECTING AND EVALUATING	1	3
D TRAINING	2	2
(SUBTOTAL)	(6)	(11)
E MAINTAINING FORMS, LOGS, AND RECORDS	2	9
(SUBTOTAL)	(2)	(9)
F PERFORMING GENERAL REFRIGERATION, AIR CONDITIONING, OR CRYOGENIC DUTIES	33	23
(SUBTOTAL)	(33)	(23)
G MAINTAINING AIR CONDITIONING SYSTEMS	12	*
H MAINTAINING REFRIGERATION SYSTEMS OTHER THAN IN CRYOGENIC PLANTS	8	*
(SUBTOTAL)	(20)	(*)
I MAINTAINING REFRIGERATION, AIR CONDITIONING, OR CRYOGENIC PLANT MAJOR COMPONENTS	18	8
J MAINTAINING CONTROL SYSTEMS	12	2
K MAINTAINING COOLING TOWERS	4	3
L MAINTAINING REFRIGERANT OR AIR COMPRESSORS	5	8
(SUBTOTAL)	(39)	(21)
M INSTALLATION OR REMOVAL OF CRYOGENIC (LOX) PLANTS	*	1
N OPERATING LOX PLANTS	*	20
O OPERATING SUPPORT EQUIPMENT AND CRYOTAINERS	*	13
(SUBTOTAL)	(*)	(34)
	100	100

* DENOTES LESS THAN ONE PERCENT

TABLE 28

EXAMPLES OF TASKS COMMON TO FUNCTIONAL GROUPS

DUTIES	REFRIG/AC PERSONNEL CLUSTER (N=877)	CRYOGENIC PLANT OPR CLUSTER (N=116)
F117 ADD OR CHANGE OIL	87	91
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	88	72
F122 ADJUST OR POSITION HAND OPERATED VALVES	68	73
F129 ALIGN MOTORS	83	50
F132 BEND COPPER TUBING	90	68
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING	91	53
F136 CLEAN AIR FILTERS	87	58
F140 CLEAN TOOLS, PARTS, OR PIPING	90	87
F144 FLARE COPPER TUBING	90	70
F145 INSPECT GAUGES OR LINES	80	78
F147 INSPECT SAFETY VALVES	48	68
F148 INSTALL INSULATION	62	66
F149 LUBRICATE BUSHINGS OR BEARINGS	82	62
F151 MEASURE AND CUT COPPER TUBING	92	70
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING, OR PAINTING	76	87
F154 PURGE LINES	71	72
F156 REMOVE OR INSTALL BELT GUARDS	80	70
F157 REMOVE OR INSTALL BELTS	86	62
F158 REMOVE OR INSTALL COUPLINGS	65	42
F161 REMOVE OR INSTALL FLANGE GASKETS	50	49
F162 REMOVE OR INSTALL GAUGES	79	81
F163 REMOVE OR INSTALL HAND OPERATED VALVE SEATS OR DISCS	42	74
F167 REMOVE OR INSTALL PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	84	55
F171 REMOVE OR INSTALL THREADED FITTINGS	74	60
F172 REMOVE OR INSTALL VALVES, SUCH AS CHECK VALVES, HAND OPERATED VALVES, OR SAFETY RELIEF VALVES	67	73
I260 INSPECT WATER PUMPS	67	56
I272 PERFORM PRESSURE TESTS	45	57
I273 PUMP DOWN UNITS OF REFRIGERATION OR AIR-CONDITIONING SYSTEMS	80	60
I278 REMOVE OR INSTALL BEARINGS OR BUSHINGS, SUCH AS IN MOTORS, COMPRESSORS, PUMPS, OR SHAFTS	76	41
I280 REMOVE OR INSTALL CONDENSERS, INTERCOOLERS, OR AFTERCOOLERS	44	38
J318 INSPECT EQUIPMENT FOR SAFETY GROUNDS	55	50
K343 ADJUST BLEED OFF RATE	38	37
K344 ADJUST DEPTH OF FLOATS IN COOLING WATER TANKS	47	37
K347 CLEAN COOLING TOWERS	60	55
K350 DRAIN COOLING TOWERS	55	60
K351 ISOLATE COOLING TOWER MALFUNCTIONS	49	38
K358 START UP OR SHUTDOWN COOLING WATER SYSTEMS	53	73
L362 BLOW DOWN CONDENSATE FROM AIR TANKS	60	56

TABLE 29

EXAMPLES OF TASKS TAUGHT IN COURSE J3ABR54530 AND
PERFORMED BY HIGH PERCENTAGES OF CRYOGENIC PERSONNEL

TASKS	PERCENT CRYO. PERS. PERFORMING	
	1ST ENL (N=46)	TOTAL (N=116)
F126 ADJUST PURGE UNITS+	56	60
F129 ALIGN MOTORS*+	37	50
F132 BEND COPPER TUBING*	54	68
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING, OR PIPING*+	37	53
F144 FLARE COPPER TUBING*	60	70
F151 MEASURE AND CUT COPPER TUBING*	54	70
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING, OR PAINTING*	93	87
F156 REMOVE OR INSTALL BELT GUARDS*	58	70
F157 REMOVE OR INSTALL BELTS*	56	62
F158 REMOVE OR INSTALL COUPLINGS*+	28	42
J318 INSPECT EQUIPMENT FOR SAFETY GROUNDS*	47	50
K343 ADJUST BLEED OFF RATE	19	37
K344 ADJUST DEPTH OF FLOATS IN COOLING WATER TANKS*	28	37
K347 CLEAN COOLING TOWERS	47	55
K350 DRAIN COOLING TOWERS	54	60
K351 ISOLATE COOLING TOWER MALFUNCTIONS*	26	38

* TASKS WHICH RECEIVED HIGH TRAINING EMPHASIS RATINGS

+ TASKS WHICH RECEIVED ABOVE AVERAGE TASK DIFFICULTY RATINGS

DISCUSSION AND IMPLICATIONS

Training in the 545X0 career ladder, as evaluated through the STS and POIs, appears to be good. Both training programs appear in good order, with tasks and training generally well matched. Further, the programs seem very complementary, as the Cryogenics course builds an area of specialization upon the well-laid foundation of the Refrigeration course. As stated earlier, however, subject-matter specialists and training personnel should review the tasks not matched to the STS and POIs to determine if coverage in the documents is warranted. The several STS and POI paragraphs noted should also be reviewed in light of OSR data to determine if existing coverage and levels are justified.

The Air Conditioning Support Personnel job type and the SAGE Plant Operators independent job type are unique among Refrigeration and Air Conditioning personnel in two respects: first, in their limited scope of performance and second, in their assignment to units other than CESSs. Repeatedly, the suggestion was heard from supervisors in these areas that first-job personnel should not be assigned to these units. Several reasons can be given for such a suggestion and merit the attention of assignments monitors at AFMPC. An initial assignment to a CES would offer more job variety for the personnel just out of basic technical training, and solidify the learning experience. Assignments in air conditioning support limit the experience at a critical stage when expanding familiarization and experience is essential to the individual's full-grasp of the responsibilities of the career ladder. Currently, half feel their training is not utilized well or not utilized at all. Consideration for such assignment on subsequent tours should be considered, but a CES seems to be the best assignment for the newly trained airman.

While the compatibility of the two functional areas is positive, the differences in the peculiar skills of the two should not be minimized. Some refamiliarization with the unique operations of one area or the other is required on an individual basis, prior to a person's reassignment to a different area. Such considerations will depend on a number of factors, which will vary from person to person, but should include the airman's previous experience, his skill-level, and the assignment itself. At an absolute minimum, refrigeration personnel should continue to receive cryogenics training prior to their assignment to a LOX plant. In addition, cryogenics personnel from the 544X0 AFSC who have not returned to CONUS since the merger of that AFSC into the present career ladder, should complete the refrigeration technical training prior to their next CONUS assignment.

While the career ladder is diverse, with two clearly defined functional areas, effective career management can turn this to an advantage. Indeed, several indicators, including training, suggest that the Air Force is well served by the close relationship. Additionally, job satisfaction suggests that the individuals are well served. This does not dismiss, however, two important problems which must be addressed if the career ladder is to continue its work effectively.

Currently 545X0 personnel who are assigned to a cryogenics position serve under a supply squadron while overseas; refrigeration personnel (with the exception of the air conditioning support function assigned to remote and/or mobility operating units) are assigned to CESSs, whether in CONUS or overseas. Realigning the management of the overseas cryogenics plant personnel to make it consistent with the remainder of the career ladder offers three benefits. First, the primary CE mission is "to acquire, construct, maintain, and operate real property facilities, and provide related management, engineering, and other support work and services" (AFR 85-10, 24 October 1975, page 2, Section A, paragraph 1). The mission and facilities related to the cryogenics function, as discussed in this study, fall clearly within this definition. Second, there is a basic logic of retaining all career ladder personnel under a single management concept, whether in CONUS or overseas. Because of the commonality of tasks (discussed earlier), and the fact that a cryogenic plant is a "real property facility", CE seems the best choice to assume the entire management function. Third, such a management design will keep cryogenics personnel in close relationship with the remainder of their career ladder while stationed abroad. This arrangement has positive implications for testing, as all personnel will be in closer touch with areas in which they will be tested. Further, cross-utilization of talents and training is possible, as cryogenics personnel might be more easily used in refrigeration operations, and refrigeration personnel might be more easily used in cryogenics operations overseas, should those options be necessary. Based on these considerations, it is recommended that the 545X0 personnel who are assigned to cryogenics plants overseas remain under the same functional management that they currently experience in the CONUS (and the same functional management that other 545X0 personnel experience overseas).

Another management option is being developed, and was discussed during a Cryogenics Working Group hosted by HQ AFMPC/MPCRAD1 (at the initiation of the Fuels (631X0) community of HQ USAF/LEYSF). This meeting, held 23-25 February 1983, discussed a number of proposals, including one to align the cryogenics personnel under the Fuels community. While USAFOMC was an observer at the working group, it reserved judgment on any proposal until its own study was completed. Now, based on this survey, the fuels proposal appears ill advised for a number of reasons. First, it eliminates the link between the refrigeration and cryogenics areas, which is important from a functional standpoint; it dismisses the commonality already established. Second, it aligns the cryogenics function with an AFS whose tasks are less functionally similar. The USAF Job Inventory for the 631X0 Fuels Career Ladder (AFPT 90-631-430, September 1980) was reviewed for tasks which are similar to those performed by the 545X0 personnel. One section, Duty H--Performing Liquid Oxygen (LOX) Functions, comes the closest to describing the jobs performed by some 545X0 cryogenics personnel, but the tasks in that duty only highlight the basically different nature of the two sets of tasks. While the 545X0 cryogenics personnel deal with a larger number of more complex maintenance and repair tasks, the 631X0 personnel are performing tasks that define an operator's rather than a maintainer's job. The maintenance tasks that the Fuels personnel do perform involve area maintenance and operator maintenance of equipment. Third, it transfers the cryogenics community, basically satisfied with their jobs, to a new career field after a merger only three years old. This has implications on future job

satisfaction and reenlistments, which are currently high. Fourth, it will radically alter the existing technical training programs; the fuels and/or cryogenics technical training will need to be expanded to include basic refrigeration training which cryogenics personnel now receive in J3ABR54530. Fifth, it does not deal with the problem of the loss of experience in the cryogenics area. For these reasons, the combining of cryogenics and fuels does not appear the better solution.

The second major problem is one of declining experience in the cryogenics functional area. The current problem stems from the rotation of cryogenics personnel to CONUS after an assignment in LOX production or storage overseas. These airmen are assigned to refrigeration and air conditioning work and are currently ineligible to return overseas in normal rotation until other 545X0 personnel have that opportunity. This practice encourages a loss of the cryogenics experience, while new people are trained, serve a tour, and are lost, as well. This situation does not need to exist as one of several options might be pursued to return qualified and experienced cryogenics personnel to that functional area. One option is the reevaluation of how the SEI is used in determining future assignment in the AFSC. A policy change might be considered, whereby those who currently hold a Cryogenics SEI might be returned to cryogenics after one, or even two, CONUS tours, rather than not making use of that person's skills until everyone goes overseas. This could be accomplished by determining a small number of critical supervisory or technical positions that would require personnel with prior cryogenics experience (as identified by an SEI). As a result, an equitable balanced rotation policy could be implemented and a suitably large pool of cryogenics qualified personnel could be maintained. Another option would be to shred the present AFSC, with those who carry the shred working the shred (cryogenics) for a tour and the slick (refrigeration) for the following tour. This option would allow a buildup of experience in the cryogenics functional area, keep the career ladders aligned, and provide the cryogenics shred with its own specialty knowledge test (SKT). (Currently cryogenics personnel test in both functional areas.) Again, it does not seem likely that a move of cryogenics to another career field will correct the problem. The problem exists now, due to no fault of cryogenics and refrigeration being placed together, but rather, because of the current way in which cryogenics slots are filled, i.e., not who is experienced, but who has not done it before. Either of the first two options will allow maximum use of the cryogenics skills developed, but which now may be lost.

APPENDIX A
SELECTED REPRESENTATIVE TASKS
FOR
CAREER LADDER STRUCTURE GROUPS

TABLE I
REFRIGERATION AND AIR CONDITIONING PERSONNEL
(GRP039)

TASKS	PERCENT MEMBERS PERFORMING (N=877)
I258 INSPECT OR CLEAN CONDENSERS	94
I268 LOCATE REFRIGERANT LEAKS USING HALIDE LEAK DETECTORS	93
F151 MEASURE AND CUT COPPER TUBING	92
I259 INSPECT OR CLEAN EVAPORATORS	92
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	91
F140 CLEAN TOOLS, PARTS, OR PIPING	90
I269 LOCATE REFRIGERANT LEAKS USING SOAP SOLUTIONS	90
F144 FLARE COPPER TUBING	90
F132 BEND COPPER TUBING	90
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	88
F117 ADD OR CHANGE OIL	87
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	87
F136 CLEAN AIR FILTERS	87
F173 REPLACE AIR FILTERS	86
F157 REMOVE OR INSTALL BELTS	86
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	85
I288 REMOVE OR INSTALL ELECTRIC MOTORS	85
F167 REMOVE OR INSTALL PIPING OR TUBING, SUCH AS WATER, REFRIGERANT, OR FUEL LINES	84
G186 CHARGE AIR CONDITIONING OR REFRIGERATION SYSTEMS WITH REFRIGERANT OTHER THAN FOR LITHIUM BROMIDE SYSTEMS	84
F129 ALIGN MOTORS	83
F174 REPLACE DRIER FILTERS OR CARTRIDGES	82
J317 CONNECT MOTORS TO ELECTRICAL POWER SOURCES	82
I292 REMOVE OR INSTALL FANS OR BLOWERS	82
J329 PERFORM CONTINUITY CHECKS	82
F177 SOFT SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	81
F130 ALIGN PULLEYS	81
F145 INSPECT GAUGES OR LINES	80
F156 REMOVE OR INSTALL BELT GUARDS	80
I273 PUMP DOWN UNITS OF REFRIGERATION OR AIR CONDITIONING SYSTEMS	80
I256 CHECK MOTORS FOR PROPER ROTATION	79
J337 REMOVE OR INSTALL ELECTRICAL WIRING	79
H233 ISOLATE MALFUNCTIONS WITHIN REFRIGERATION SYSTEMS, SUCH AS TO COMPRESSORS, ELECTRICAL SYSTEMS, OR CONDENSERS	79
H235 PERFORM RECURRING MAINTENANCE PROGRAM ON REFRIGERATION SYSTEMS OTHER THAN CRYOGENICS	78

TABLE IA
REFRIGERATION AND AIR CONDITIONING FIRST-LINE SUPERVISORS
(GRP419)

TASKS	PERCENT MEMBERS PERFORMING (N=48)
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	100
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	100
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	100
H235 PERFORM RECURRING MAINTENANCE PROGRAM ON REFRIGERATION SYSTEMS OTHER THAN CRYOGENICS	100
F151 MEASURE AND CUT COPPER TUBING	100
F144 FLARE COPPER TUBING	100
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	100
F157 REMOVE OR INSTALL BELTS	100
F149 LUBRICATE BUSHINGS OR BEARINGS	100
H245 START UP OR SHUTDOWN REFRIGERATION SYSTEMS	100
F156 REMOVE OR INSTALL BELT GUARDS	100
J329 PERFORM CONTINUITY CHECKS	97
B40 SUPERVISE REFRIGERATION AND CRYOGENIC SPECIALISTS (AFSC 54550)	97
J323 ISOLATE ELECTRICAL CONTROL SYSTEM MALFUNCTIONS	97
F132 BEND COPPER TUBING	97
I292 REMOVE OR INSTALL FANS OR BLOWERS	97
J337 REMOVE OR INSTALL ELECTRICAL WIRING	97
F136 CLEAN AIR FILTERS	97
J336 REMOVE OR INSTALL CONTROL VOLTAGE TRANSFORMERS	97
I286 REMOVE OR INSTALL DRIERS	97
F129 ALIGN MOTORS	97
F174 REPLACE DRIER FILTERS OR CARTRIDGES	97
L375 OPERATE SINGLE STAGE AIR COMPRESSORS	97
F170 REMOVE OR INSTALL STRAINERS	97
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	97
F172 REMOVE OR INSTALL VALVES, SUCH AS CHECK VALVES, HAND OPERATED VALVES, OR SAFETY RELIEF VALVES	97
J321 ISOLATE CONTROL VOLTAGE TRANSFORMER MALFUNCTIONS	95
H234 PERFORM PREOPERATIONAL CHECKS ON REFRIGERATION SYSTEMS OTHER THAN CRYOGENICS	95
C63 PREPARE APRs	93
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	93
J342 REMOVE OR INSTALL TIMERS	93

TABLE 1B
AIR CONDITIONING SUPPORT PERSONNEL
(GRP094)

TASKS	PERCENT MEMBERS PERFORMING (N=72)
I258 INSPECT OR CLEAN CONDENSERS	97
I259 INSPECT OR CLEAN EVAPORATORS	93
I288 REMOVE OR INSTALL ELECTRIC MOTORS	91
G186 CHARGE AIR CONDITIONING OR REFRIGERATION SYSTEMS WITH REFRIGERANT OTHER THAN FOR LITHIUM BROMIDE WYSTEMS	90
I268 LOCATE REFRIGERANT LEAKS USING HALIDE LEAK DETECTORS	90
F143 EVACUATE REFRIGERATION OR AIR CONDITIONING SYSTEMS	88
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEIVERS, EVAPORATORS, TUBING OR PIPING	87
J322 ISOLATE ELECTRICAL CIRCUIT MALFUNCTIONS	86
J329 PERFORM CONTINUITY CHECKS	84
F136 CLEAN AIR FILTERS	84
J333 REMOVE OR INSTALL CIRCUIT BREAKERS	83
J337 REMOVE OR INSTALL ELECTRICAL WIRING	80
F140 CLEAN TOOLS, PARTS, OR PIPING	77
I269 LOCATE REFRIGERANT LEAKS USING SOAP SOLUTIONS	77
J320 ISOLATE CIRCUIT BREAKER MALFUNCTIONS	75
J335 REMOVE OR INSTALL CONTROL RELAYS OR COMPONENTS	73
I292 REMOVE OR INSTALL FANS OR BLOWERS	73
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING OR PAINTING	72
I263 ISOLATE ELECTRIC MOTOR MALFUNCTIONS	72
F145 INSPECT GAUGES OR LINES	70
F173 REPLACE AIR FILTERS	69
J323 ISOLATE ELECTRICAL CONTROL SYSTEM MALFUNCTIONS	68
B36 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	68
J318 INSPECT EQUIPMENT FOR SAFETY GROUNDS	66
J317 CONNECT MOTORS TO ELECTRICAL POWER SOURCES	66
E110 MAKE ENTRIES ON SERVICEABLE TAG-MATERIAL FORMS (DD FORM 1574)	66
G203 ISOLATE MALFUNCTIONS WITHIN PACKAGE AIR CONDITIONING UNITS	65
E107 MAKE ENTRIES ON ISSUE/TURN-IN REQUEST FORMS (AF FORM 2005)	65
I256 CHECK MOTORS FOR PROPER ROTATION	65
G209 PERFORM RECURRING MAINTENANCE PROGRAM (RMP) ON AIR CONDITIONING SYSTEMS	63
J324 ISOLATE ELECTRICAL POWER SUPPLY MALFUNCTIONS	63
E108 MAKE ENTRIES ON REPARABLE ITEM PROCESSING TAG FORMS (AFTO FORM 350)	63

TABLE IC

HVAC PERSONNEL
(GRP125)

TASKS	PERCENT MEMBERS PERFORMING (N=7)
J316 CALIBRATE THERMOSTATS	100
J315 CALIBRATE HUMIDISTATS	100
J340 REMOVE OR INSTALL PNEUMATIC CONTROL SYSTEM COMPONENTS	100
J313 ADJUST PNEUMATIC OR ELECTRICAL SWITCHES, SUCH AS SAFETY, PRESSURE, OR LEVEL	100
F120 ADJUST DAMPERS	100
J314 CALIBRATE ELECTRONIC CONTROLS	100
J330 PERFORM OPERATIONAL CHECKS OF ELECTRONIC CIRCUITS	100
F121 ADJUST MECHANICAL LINKAGES	100
J319 INSPECT PNEUMATIC OR ELECTRICAL CONTROLS FOR SAFETY	100
J331 PERFORM OPERATIONAL CHECKS OF PNEUMATIC OR ELECTRICAL CIRCUITS	85
J326 ISOLATE PNEUMATIC CONTROL SYSTEM MALFUNCTIONS	85
F162 REMOVE OR INSTALL GAUGES	85
J335 REMOVE OR INSTALL CONTROL RELAYS OR COMPONENTS	85
F165 REMOVE OR INSTALL MECHANICAL LINKAGES	85
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	85
G191 INSPECT REHEATING SYSTEMS	85
G189 INSPECT DEHUMIDIFIER EQUIPMENT	85
G190 INSPECT HUMIDITY EQUIPMENT	85
J339 REMOVE OR INSTALL HUMIDISTATS	85
J338 REMOVE OR INSTALL ELECTRONIC CONTROL SYSTEM COMPONENTS	85
J325 ISOLATE ELECTRONIC CONTROL SYSTEM MALFUNCTIONS	85
J329 PERFORM CONTINUITY CHECKS	85
G184 BALANCE AIR CONDITIONING SYSTEMS	71
F150 MEASURE AIRFLOW	71
F145 INSPECT GAUGES OR LINES	71
G225 USE PSYCHROMETERS TO DETERMINE WET AND DRY BULB TEMPERATURES	71
F169 REMOVE OR INSTALL PULLEYS	71
G226 USE PSYCHROMETRIC CHARTS TO DETERMINE EFFICIENCY OF AIR CONDITIONING SYSTEMS	71
I258 INSPECT OR CLEAN CONDENSERS	71
F130 ALIGN PULLEYS	71
J323 ISOLATE ELECTRICAL CONTROL SYSTEM MALFUNCTIONS	71
F124 ADJUST PRESSURE REGULATORS	57
G199 ISOLATE MALFUNCTIONS WITHIN CENTRAL AIR CONDITIONING UNITS	57
G200 ISOLATE MALFUNCTIONS WITHIN CENTRIFUGAL AIR CONDITIONING SYSTEMS	57

TABLE II
CRYOGENICS PLANT OPERATORS
(GRP052)

TASKS	PERCENT MEMBERS PERFORMING (N=116)
O430 GROUND CRYOGENIC EQUIPMENT, SUCH AS CRYOTAINERS OR PLANT SUPPORT EQUIPMENT	96
O432 OPERATE PURGE UNITS	95
O442 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	94
O433 OPERATE VACUUM PUMPS	93
N422 SET UP OR OPERATE PRODUCT PURITY TEST SETS	91
F117 ADD OR CHANGE OIL	91
N417 PERFORM ODOR TESTS	90
N406 CONNECT OR DISCONNECT TRANSFER HOSES	90
O435 PERFORM PERIODIC INSPECTIONS ON CRYOTAINERS	90
O429 CONNECT OR DISCONNECT CRYOTAINER PURGING UNITS	89
O436 PERFORM PERIODIC INSPECTIONS ON PURGING UNITS	88
N410 FILL COSMODYNE SAMPLES	88
O427 CHECK VACUUM IN CRYOTAINERS	88
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING OR PAINTING	87
F140 CLEAN TOOLS, PARTS, OR PIPING	87
O437 PERFORM PERIODIC INSPECTIONS ON VACUUM PUMPS	87
N419 PRODUCE CRYOGENIC PRODUCTS, SUCH AS GASEOUS AND LIQUID OXYGEN OR GASEOUS AND LIQUID NITROGEN	86
N413 MAINTAIN PRODUCT PURITY DURING PRODUCTION	86
N424 SHUTDOWN LOX PLANTS	86
N408 ESTABLISH AIR FLOW THROUGHOUT PLANT	85
N418 PERFORM PREOPERATIONAL OR DAILY INSPECTIONS OF PLANTS	85
N414 MIX PRODUCT PURITY TEST SOLUTIONS	85
N420 REACTIVATE ABSORBERS OR PURIFIERS	84
N425 START UP LOX PLANTS	84
N407 DEFROST PLANTS	84
N404 ADJUST PRODUCT PUMP SPEEDS	82
E94 MAKE ENTRIES ON AVIATOR BREATHING OXYGEN SERVICING TRAILER LOG FORMS (AFTO FORM 134)	81
F162 REMOVE OR INSTALL GAUGES	81
N411 INSPECT CONDITION OF GAS STORAGE CYLINDERS	79
N405 CHARGE STORAGE CYLINDERS	78
F145 INSPECT GAUGES OR LINES	78
N423 SET VALVES FOR LOX PLANT STORAGE	78
O434 PERFORM LEAK TESTS ON GAS STORAGE CYLINDERS	76
N409 EVACUATE GAS CYLINDERS	75
F175 RESURFACE VALVE SEATS OR DISCS	74

TABLE IIA
CRYOGENICS FIRST-LINE SUPERVISORS
(GRP322)

TASKS	PERCENT MEMBERS PERFORMING (N=38)
N419 PRODUCE CRYOGENIC PRODUCTS, SUCH AS GASEOUS AND LIQUID OXYGEN OR GASEOUS AND LIQUID NITROGEN	100
N418 PERFORM PREOPERATIONAL OR DAILY INSPECTIONS OF PLANTS	100
N420 REACTIVATE ABSORBERS OR PURIFIERS	100
N422 SET UP OR OPERATE PRODUCT PURITY TEST SETS	100
N424 SHUTDOWN LOX PLANTS	100
O435 PERFORM PERIODIC INSPECTIONS ON CRYOTAINERS	100
O433 OPERATE VACUUM PUMPS	100
O436 PERFORM PERIODIC INSPECTIONS ON PURGING UNITS	100
O437 PERFORM PERIODIC INSPECTIONS ON VACUUM PUMPS	100
O432 OPERATE PURGE UNITS	100
O427 CHECK VACUUM IN CRYOTAINERS	100
N405 CHARGE STORAGE CYLINDERS	97
N408 ESTABLISH AIR FLOW THROUGHOUT PLANT	97
N425 START UP LOX PLANTS	97
N407 DEFROST PLANTS	97
N406 CONNECT OR DISCONNECT TRANSFER HOSES	97
O430 GROUND CRYOGENIC EQUIPMENT, SUCH AS CRYOTAINERS OR PLANT SUPPORT EQUIPMENT	97
F117 ADD OR CHANGE OIL	97
N404 ADJUST PRODUCT PUMP SPEEDS	97
N412 ISOLATE AIR SEPARATION SYSTEM MALFUNCTIONS	97
N423 SET VALVES FOR LOX PLANT STORAGE	97
L359 ADJUST AIR COMPRESSOR FORCE-FEED LUBRICATOR PUMPS	97
O431 ISOLATE MALFUNCTIONS WITHIN PRESSURIZATION OR TRANSFER SYSTEMS ON CRYOTAINERS	97
O442 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	94
N413 MAINTAIN PRODUCT PURITY DURING PRODUCTION	94
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING OR PAINTING	94
N411 INSPECT CONDITION OF GAS STORAGE CYLINDERS	94
N410 FILL COSMODYNE SAMPLES	94
O434 PERFORM LEAK TESTS ON GAS STORAGE CYLINDERS	94
O429 CONNECT OR DISCONNECT CRYOTAINER PURGING UNITS	94
F163 REMOVE OR INSTALL HAND OPERATED VALVE SEATS OR DISCS	94
F156 REMOVE OR INSTALL BELT GUARDS	94
F157 REMOVE OR INSTALL BELTS	94
F137 CLEAN MOLECULAR SIEVE DUST FILTERS	94
N417 PERFORM ODOR TESTS	92

TABLE IIB
CRYOGENICS PRODUCTION NCOICs
(GRP335)

TASKS	PERCENT MEMBERS PERFORMING (N=8)
C60 INSPECT CRYOGENIC PLANT OPERATIONS	100
E91 ANALYZE DAILY LOGS	100
C63 PREPARE APRs	100
C45 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	100
A12 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	100
E113 MAKE ENTRIES ON SYSTEM/EQUIPMENT STATUS RECORD FORMS (AFTO FORM 244 AND 245)	100
C49 EVALUATE MAINTENANCE OR USE OF WORKSPACE, EQUIPMENT, OR SUPPLIES	100
N419 PRODUCE CRYOGENIC PRODUCTS, SUCH AS GASEOUS AND LIQUID OXYGEN OR GASEOUS AND LIQUID NITROGEN	100
F140 CLEAN TOOLS, PARTS, OR PIPING	100
D74 DEMONSTRATE HOW TO LOCATE TECHNICAL INFORMATION	100
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	100
D73 COUNSEL TRAINEES ON TRAINING PROGRESS	100
N404 ADJUST PRODUCT PUMP SPEEDS	100
N405 CHARGE STORAGE CYLINDERS	100
N413 MAINTAIN PRODUCT PURITY DURING PRODUCTION	100
F155 REMOVE OR INSTALL AIR VALVE COMPONENTS	100
N420 REACTIVATE ABSORBERS OR PURIFIERS	100
O442 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	100
N406 CONNECT OR DISCONNECT TRANSFER HOSES	100
N412 ISOLATE AIR SEPARATION SYSTEM MALFUNCTIONS	100
N417 PERFORM ODOR TESTS	100
F144 FLARE COPPER TUBING	100
N407 DEFROST PLANTS	100
F171 REMOVE OR INSTALL THREADED FITTINGS	100
N408 ESTABLISH AIR FLOW THROUGHOUT PLANT	100
N409 EVACUATE GAS CYLINDERS	100
N410 FILL COSMODYNE SAMPLES	100
N414 MIX PRODUCT PURITY TEST SOLUTIONS	100
N424 SHUTDOWN LOX PLANTS	100
D68 ASSIGN ON-THE-JOB TRAINING (OJT) TRAINERS	100
C46 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, OR RECLASSIFICATION	100
C52 EVALUATE QUALITY CONTROL PROGRAMS	88
D70 CONDUCT OJT	88
A19 PLAN WORK ASSIGNMENTS	88

TABLE IIC
CRYOGENICS STORAGE NCOICs
(GRP196)

TASKS	PERCENT MEMBERS PERFORMING (N=9)
0442 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	100
0427 CHECK VACUUM IN CRYOTAINERS	100
0433 OPERATE VACUUM PUMPS	100
0435 PERFORM PERIODIC INSPECTIONS ON CRYOTAINERS	100
E94 MAKE ENTRIES ON AVIATOR BREATHING OXYGEN SERVICING TRAILER LOG FORMS (AFTO FORM 134)	100
0430 GROUND CRYOGENIC EQUIPMENT, SUCH AS CRYOTAINERS OR PLANT SUPPORT EQUIPMENT	100
0429 CONNECT OR DISCONNECT CRYOTAINER PURGING UNITS	100
0432 OPERATE PURGE UNITS	100
0436 PERFORM PERIODIC INSPECTIONS ON PURGING UNITS	100
0437 PERFORM PERIODIC INSPECTIONS ON VACUUM PUMPS	100
B36 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	100
0441 STENCIL OR MARK CRYOTAINERS OR PURGING UNITS	100
0438 REMOVE OR INSTALL CRYOTAINER LINE FILTERS	100
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING OR PAINTING	88
E113 MAKE ENTRIES ON SYSTEM/EQUIPMENT STATUS RECORD FORMS (AFTO FORM 244 AND 245)	88
F140 CLEAN TOOLS, PARTS, OR PIPING	88
A19 PLAN WORK ASSIGNMENTS	88
E116 MAKE ENTRIES ON CRYOGENIC MATERIALS SAMPLE FORMS (AFTO FORM 176)	88
B31 IMPLEMENT SAFETY PROGRAMS	88
0428 CLEAN CRYOTAINER LINE FILTERS	88
0439 REMOVE OR INSTALL "O" RING SEALS ON CRYOTAINERS	88
0426 CHECK OR CLEAN MAGNETIC RELAYS ON PURGING UNITS	88
F154 PURGE LINES	77
A6 DETERMINE WORK PRIORITIES	77
E101 MAKE ENTRIES ON BASE FUELS SAMPLING AND TESTING RECORD FORMS (AFTO FORM 150)	77
F145 INSPECT GAUGES OR LINES	77
0431 ISOLATE MALFUNCTIONS WITHIN PRESSURIZATION OR TRANSFER SYSTEMS ON CRYOTAINERS	77
A14 ESTABLISH QUALITY CONTROL PROGRAMS	77
F147 INSPECT SAFETY VALVES	77
B28 DIRECT MAINTENANCE OF EQUIPMENT	77
D82 EVALUATE OJT TRAINEES	77
D74 DEMONSTRATE HOW TO LOCATE TECHNICAL INFORMATION	77

TABLE IID
CRYOGENICS STORAGE OPERATORS
(GRP179)

TASKS	PERCENT MEMBERS PERFORMING (N=5)
0442 TRANSFER FLUIDS BETWEEN CRYOTAINERS OR SERVICING CARTS	100
0430 GROUND CRYOGENIC EQUIPMENT, SUCH AS CRYOTAINERS OR PLANT SUPPORT EQUIPMENT	100
0429 CONNECT OR DISCONNECT CRYOTAINER PURGING UNITS	100
0435 PERFORM PERIODIC INSPECTIONS ON CRYOTAINERS	100
0436 PERFORM PERIODIC INSPECTIONS ON PURGING UNITS	100
0427 CHECK VACUUM IN CRYOTAINERS	100
N410 FILL COSMODYNE SAMPLES	100
0433 OPERATE VACUUM PUMPS	100
E94 MAKE ENTRIES ON AVIATOR BREATHING OXYGEN SERVICING TRAILER LOG FORMS (AFTO FORM 134)	80
E101 MAKE ENTRIES ON BASE FUELS SAMPLING AND TESTING RECORD FORMS (AFTO FORM 150)	80
N417 PERFORM ODOR TESTS	80
F153 PERFORM CORROSION CONTROL, SUCH AS SCRAPING, SANDING OR PAINTING	80
0432 OPERATE PURGE UNITS	80
N406 CONNECT OR DISCONNECT TRANSFER HOSES	80
0438 REMOVE OR INSTALL CRYOTAINER LINE FILTERS	80
0437 PERFORM PERIODIC INSPECTIONS ON VACUUM PUMPS	80
F117 ADD OR CHANGE OIL	80
N416 PERFORM LIQUID PRODUCT PARTICULATE TESTS	60
F122 ADJUST OR POSITION HAND OPERATED VALVES	60
F154 PURGE LINES	60
0441 STENCIL OR MARK CRYOTAINERS OR PURGING UNITS	60
0431 ISOLATE MALFUNCTIONS WITHIN PRESSURIZATION OR TRANSFER SYSTEMS ON CRYOTAINERS	60
J318 INSPECT EQUIPMENT FOR SAFETY GROUNDS	60
N422 SET UP OR OPERATE PRODUCT PURITY TEST SETS	60
N421 REMOVE OR INSTALL RUPTURE OR SAFETY DISCS	60
0426 CHECK OR CLEAN MAGNETIC RELAYS ON PURGING UNITS	60
F147 INSPECT SAFETY VALVES	60

TABLE III
SUPERVISORS
(GRP073)

TASKS	PERCENT MEMBERS PERFORMING (N=62)
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	95
A6 DETERMINE WORK PRIORITIES	91
C63 PREPARE APRs	88
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	83
A23 SCHEDULE LEAVES OR PASSES	82
A19 PLAN WORK ASSIGNMENTS	80
A2 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	80
D86 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	79
C59 INDORSE AIRMEN PERFORMANCE REPORTS (APR)	74
A12 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	74
C45 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	74
C49 EVALUATE MAINTENANCE OR USE OF WORKSPACE, EQUIPMENT, OR SUPPLIES	74
B28 DIRECT MAINTENANCE OF EQUIPMENT	72
B31 IMPLEMENT SAFETY PROGRAMS	72
D73 COUNSEL TRAINEES ON TRAINING PROGRESS	72
A5 DETERMINE REQUIREMENTS FOR SPACE, PERSONNEL, EQUIPMENT OR SUPPLIES	72
A9 DEVELOP WORK METHODS OR PROCEDURES	70
A1 ASSIGN PERSONNEL TO DUTY POSITIONS	69
C46 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, OR RECLASSIFICATION	67
C58 EVALUATE WORK SCHEDULES	66
D68 ASSIGN ON-THE-JOB TRAINING (OJT) TRAINERS	66
C43 ANALYZE WORK LOAD REQUIREMENTS	66
D82 EVALUATE OJT TRAINEES	66
B42 WRITE CORRESPONDENCE	64
D70 CONDUCT OJT	64
B40 SUPERVISE REFRIGERATION AND CRYOGENIC SPECIALISTS (AFSC 54550)	62
C57 EVALUATE UTILIZATION OF PERSONNEL	62
B29 DIRECT UTILIZATION OF EQUIPMENT	62
B36 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	62
C47 EVALUATE INSPECTION REPORTS OR PROCEDURES	62
E14 MAKE ENTRIES ON UNSERVICEABLE (CONDEMNED) TAG MATERIAL FORMS (DD FORM 1577)	62
B38 SUPERIVSE CIVILIAN EMPLOYEES	61
A21 PREPARE PROPOSALS FOR IMPROVEMENT OF MAINTENANCE PROCEDURES	61

TABLE IIIA

REFRIGERATION AND AIR CONDITIONING SHOP SUPERVISORS
(GRP105)

TASKS	PERCENT MEMBERS PERFORMING (N=20)
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	100
A19 PLAN WORK ASSIGNMENTS	95
C63 PREPARE APRs	95
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	95
B40 SUPERVISE REFRIGERATION AND CRYOGENIC SPECIALISTS (AFSC 54550)	95
B28 DIRECT MAINTENANCE OF EQUIPMENT	95
D73 COUNSEL TRAINEES ON TRAINING PROGRESS	95
D70 CONDUCT OJT	95
B36 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	95
J329 PERFORM CONTINUITY CHECKS	95
A6 DETERMINE WORK PRIORITIES	90
C59 INDORSE AIRMAN PERFORMANCE REPORTS (APR)	90
D86 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	90
A2 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	90
A23 SCHEDULE LEAVES OR PASSES	90
D75 DETERMINE OJT TRAINING REQUIREMENTS	90
A12 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	85
D68 ASSIGN ON-THE-JOB TRAINING (OJT) TRAINERS	85
C45 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	85
C43 ANALYZE WORK LOAD REQUIREMENTS	85
D82 EVALUATE OJT TRAINEES	85
G186 CHARGE AIR CONDITIONING OR REFRIGERATION SYSTEMS WITH REFRIGERANT OTHER THAN FOR LITHIUM BROMIDE SYSTEMS	85
F133 BRAZE OR SILVER SOLDER LINES OR FITTINGS, SUCH AS CONDENSERS, RECEVERS, EVAPORATORS, TUBING OR PIPING	85
B29 DIRECT UTILIZATION OF EQUIPMENT	80
C57 EVALUATE UTILIZATION OF PERSONNEL	80
G224 USE PRESSURE-TEMPERATURE CHARTS TO DETERMINE AIR CONDITIONING UNIT EFFICIENCY	80
J323 ISOLATE ELECTRICAL CONTROL SYSTEM MALFUNCTIONS	80
I288 REMOVE OR INSTALL ELECTRIC MOTORS	80
F144 FLARE COPPER TUBING	80
A9 DEVELOP WORK METHODS OR PROCEDURES	75
B39 SUPERVISE REFRIGERATION AND CRYOGENIC SPECIALISTS (AFSC 54530)	75
D87 PLAN OJT	75
B31 IMPLEMENT SAFETY PROGRAMS	75

TABLE III B
MECHANICAL SUPERINTENDENTS
(GRP161)

TASKS	PERCENT MEMBERS PERFORMING (N=25)
B38 SUPERVISE CIVILIAN EMPLOYEES	96
A6 DETERMINE WORK PRIORITIES	96
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	96
A2 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	96
C63 PREPARE APRs	92
A23 SCHEDULE LEAVES OR PASSES	92
C46 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, OR RECLASSIFICATION	88
B31 IMPLEMENT SAFETY PROGRAMS	88
A19 PLAN WORK ASSIGNMENTS	84
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	84
C65 WRITE CIVILIAN PERFORMANCE RATINGS OR SUPERVISORY APPRAISALS	84
C61 INSPECT REFRIGERATION OR AIR CONDITIONING REPAIR SHOP OPERATIONS	80
B28 DIRECT MAINTENANCE OF EQUIPMENT	80
C59 INDORSE AIRMAN PERFORMANCE REPORTS (APR)	80
A1 ASSIGN PERSONNEL TO DUTY POSITIONS	80
C58 EVALUATE WORK SCHEDULES	76
C49 EVALUATE MAINTENANCE OR USE OF WORKSPACE, EQUIPMENT, OR SUPPLIES	76
A9 DEVELOP WORK METHODS OR PROCEDURES	76
A21 PREPARE PROPOSALS FOR IMPROVEMENT OF MAINTENANCE PROCEDURES	76
A5 DETERMINE REQUIREMENTS FOR SPACE, PERSONNEL, EQUIPMENT OR SUPPLIES	76
C64 SELECT INDIVIDUALS FOR SPECIALIZED TRAINING	76
D68 ASSIGN ON-THE-JOB TRAINING (OJT) TRAINERS	72
C45 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	72
A11 ESTABLISH ORGANIZATIONAL POLICIES, OFFICE INSTRUCTIONS (OI) OR STANDARD OPERATING PROCEDURES (SOP)	72
B34 INITIATE PERSONNEL ACTION REQUESTS	72
B42 WRITE CORRESPONDENCE	68
A12 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	68
C57 EVALUATE UTILIZATION OF PERSONNEL	68
A17 PLAN SAFETY PROGRAMS	68
B29 DIRECT UTILIZATION OF EQUIPMENT	68
D86 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	64
C43 ANALYZE WORK LOAD REQUIREMENTS	64

TABLE III C
CRYOGENICS ADMINISTRATIVE PERSONNEL
(GRP185)

TASKS	PERCENT MEMBERS PERFORMING (N=6)
A6 DETERMINE WORK PRIORITIES	100
C45 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	100
C49 EVALUATE MAINTENANCE OR USE OF WORKSPACE, EQUIPMENT, OR SUPPLIES	100
E107 MAKE ENTRIES ON ISSUE/TURN-IN REQUEST FORMS (AF FORM 2005)	100
E109 MAKE ENTRIES ON REQUISITION AND INVOICE/SHIPPING DOCUMENT FORMS (DD FORM 1149)	100
C50 EVALUATE MAINTENANCE REPORTS OR PROCEDURES	100
B26 DIRECT DEVELOPMENT OR MAINTENANCE OF STATUS BOARDS, GRAPHS, OR CHARTS	100
C51 EVALUATE PROCEDURES FOR STORAGE, INVENTORY, OR INSPECTION OF PROPERTY ITEMS	100
E114 MAKE ENTRIES ON UNSERVICEABLE (CONDEMNED) TAG MATERIAL FORMS (DD FORM 1577)	100
E115 MAKE ENTRIES ON UNSERVICEABLE (REPARABLE) TAG MATERIAL FORMS (DD FORM 1577-2)	100
E108 MAKE ENTRIES ON REPARABLE ITEM PROCESSING TAG FORMS (AFTO FORM 350)	100
E110 MAKE ENTRIES ON SERVICEABLE TAG-MATERIAL FORMS (DD FORM 1574)	100
B42 WRITE CORRESPONDENCE	83
B28 DIRECT MAINTENANCE OF EQUIPMENT	83
B27 DIRECT MAINTENANCE OF ADMINISTRATIVE FILES	83
E113 MAKE ENTRIES ON SYSTEM/EQUIPMENT STATUS RECORD FORMS (AFTO FORM 244 AND 245)	83
B35 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	83
C47 EVALUATE INSPECTION REPORTS OR PRECEDURES	83
A14 ESTABLISH QUALITY CONTROL PROGRAMS	83
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	83
C52 EVALUATE QUALITY CONTROL PROGRAMS	83
B32 IMPLEMENT SECURITY PROGRAMS	83
A9 DEVELOP WORK METHODS OR PROCEDURES	83
A11 ESTABLISH ORGANIZATIONAL POLICIES, OFFICE INSTRUCTIONS (OI) OR STANDARD OPERATING PROCEDURES (SOP)	83
A18 PLAN SECURITY PROGRAMS	83
C60 INSPECT CRYOGENIC PLANT OPERATIONS	67
E116 MAKE ENTRIES ON CRYOGENIC MATERIALS SAMPLE FORMS (AFTO FORM 176)	67

TABLE IV
SAGE PLANT OPERATORS
(GRP062)

TASKS	PERCENT MEMBERS PERFORMING (N=10)
E92 MAINTAIN OPERATOR LOGS ON AIR CONDITIONING OR REFRIGERATION EQUIPMENT	100
L362 BLOW DOWN CONDENSATE FROM AIR TANKS	80
E91 ANALYZE DAILY LOGS	80
I256 CHECK MOTORS FOR PROPER ROTATION	70
F117 ADD OR CHANGE OIL	70
F118 ADD WATER OR ANTIFREEZE	70
K358 START UP OR SHUTDOWN COOLING WATER SYSTEMS	60
F122 ADJUST OR POSITION HAND OPERATED VALVES	60
H245 START UP OR SHUTDOWN REFRIGERATION SYSTEMS	60
F145 INSPECT GAUGES OR LINES	50
F124 ADJUST PRESSURE REGULATORS	50
I310 START UP OR SHUTDOWN DIESEL ENGINES	50
F120 ADJUST DAMPERS	50
I260 INSPECT WATER PUMPS	40
F140 CLEAN TOOLS, PARTS, OR PIPING	40
F119 ADJUST BELT TENSION, SUCH AS V-BELT OR DRIVE BELTS	40
D70 CONDUCT OJT	40
F126 ADJUST PURGE UNITS	40
L374 OPERATE MULTI-STAGE AIR COMPRESSORS	30
L375 OPERATE SINGLE-STAGE AIR COMPRESSORS	30
F123 ADJUST OUTPUT OF ALTERNATING CURRENT GENERATOR SETS	30
F149 LUBRICATE BUSHINGS OR BEARINGS	30
F121 ADJUST MECHANICAL LINKAGES	30

TABLE V
TECHNICAL TRAINING INSTRUCTORS
(GRP065)

TASKS	PERCENT MEMBERS PERFORMING (N=6)
O71 CONDUCT RESIDENT COURSE CLASSROOM TRAINING	100
D67 ADMINISTER TESTS	83
D89 SCORE TESTS	83
D90 WRITE TEST QUESTIONS	83
B25 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED PROBLEMS	50
D86 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	50
E108 MAKE ENTRIES ON REPARABLE ITEM PROCESSING TAG FORMS (AFTO FORM 350)	33
D73 COUNSEL TRAINEES ON TRAINING PROGRESS	33
D83 EVALUATE PROGRESS OF RESIDENT COURSE STUDENTS	33
D77 DEVELOP RESIDENT COURSE OR CAREER DEVELOPMENT COURSE (CDC) CURRICULUM MATERIALS	33
D88 PROCURE TRAINING AIDS, SPACE, OR EQUIPMENT	33
F124 ADJUST PRESSURE REGULATORS	33
F121 ADJUST MECHANICAL LINKAGES	33
F135 CALIBRATE GAUGES	33

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